

**CONTRACT 229944**  
**April 29, 2003**

# **Central Puget Sound Regional Fare Coordination Project Smart Card System Procurement**

## **Division II: Services Specifications**

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## INTRODUCTION

Division II describes services to be provided by the Contractor in support of the Regional Fare Coordination System. The following provides a brief summary of each Section of Division II.

### Section 6.II-1 through 6.II-8

These describe centralized services required to provide or support the following RFCS functions:

- **Customer Service.** Each public transportation Agency will continue to provide direct customer service to their customer base. This section describes additional customer service functions to be provided on a regional level for the RFCS.
- **Institutional Programs.** Institutional program customers form a primary market for public transportation Agencies in the Central Puget Sound Region. Innovative fare card issuance and revalue solutions are required for these customers, to maximize flexibility and convenience for the institutions, cardholders, and Agencies.
- **Card Procurement and Distribution.** This describes RFCS functions related to the procurement and inventory of fare cards, and distribution to issuance points in the revalue network.
- **Card Management.** This includes initializing, issuing and updating cards, tracking of all fare cards in circulation, and maintaining central system databases with relevant card account information.
- **Clearinghouse Services.** This refers to the provision of central management, control and settlement functions required for the overall operation of the RFCS.
- **Financial Management.** This describes the services required for the financial management of revenues accrued through the RFCS.
- **Network Management.** The RFCS will include a number of central and distributed systems in a network. This section describes requirements for the overall management of that network.

### Section 6.II-9

This describes requirements for the fare card revalue network. The Contractor shall provide the equipment, training and technical maintenance to support a retail revalue network. The Agencies will determine retail site locations, establish accounts with the retailers, and manage the accounts on a day to day basis. The Contractor is

encouraged to identify innovative revalue strategies and systems that provide regional revalue options, and meet the needs of all public transportation customer markets.

### **Sections 6.II-10 through 6.II-12**

These describe services that the Contractor shall provide in support of the implementation and ongoing operation of the overall RFC system. These include:

- **Technical Support and Maintenance** for equipment and systems installed as part of this Contract.
- **System Implementation** criteria, to be used by the Contractor to develop an implementation plan. A phased implementation is anticipated, and close coordination will be required with each Agency to accommodate their specific needs and constraints.
- **Training.** This includes training Agency staff and trainers in the installation, operation and maintenance of RFCS equipment.

**6.II-1 CUSTOMER SERVICE****6.II-1.1 Customer Service Description**

Customer service functions shall include call center, mail center, and Internet functions. For call and mail center functions, the Agencies shall provide “first tier” customer service for both individual cardholders and institutions (DR 1) as follows:

- Providing call center functions in a “card not present” environment that includes establishing new individual and institutional accounts, issuing cards, providing RFCS program information (including alternative languages), responding to card account inquiries, updating card account parameters, and conducting basic troubleshooting.
- Providing mail center functions and local fulfillment of individual card and batch institutional orders. Mail center functions shall include establishing new individual and institutional accounts, providing RFCS program information, issuing individual and batch card orders, responding to mail in card account inquiries, updating card account parameters, conducting basic troubleshooting, and replacing cards.
- Providing fulfillment of individual card and batch institutional orders received through the Internet website.

The Contractor shall provide the equipment and functionality to allow the agencies to provide first tier customer service functions, including on-line access to a knowledge base and help database. The Contractor shall also directly provide the following customer service functions:

- Provision of “second tier” call functions in a “card not present” environment that includes all of the agency functions listed above, as well as advanced troubleshooting. All calls will initially be received by an agency, and forwarded for second tier support only if the local Agency is unable to resolve the problem.
- Operation of an Internet website on behalf of the agencies to support individual card account establishment and management, and institutional account management (institutional account establishment will be the responsibility of the Agencies). Fulfillment of Internet orders will be by the Agencies.

The Contractor provided customer service functions are envisioned as augmenting the Agency provided services, and will focus on service issues specific to the RFCS card. Calls or other queries received by the Contractor related to Agency specific issues, such as route or fare information, shall be routed to that Agency for disposition.

Over the counter face to face customer service shall be provided at Agency CSO locations, and shall be supported electronically through the Contractor's central systems.

## 6.II-1.2 Functional Requirements

### 1.2.1 Customer Service

The Contractor shall provide the equipment and services to support first and second tier customer service activities as listed in Figure II-1.1.

**Figure II-1.1: Customer Service Activity Summary**

Activities	Agency (First Tier)			Contractor (Second Tier)	
	Call Center	Mail Center	Internet**	Call Center	Mail Center
Order new card • Process payment • Account set up • Initialize card • Mail card	yes	yes	yes	no	no
Revalue an existing card* • Process payment • Update database • Download revalue transaction	yes	yes	yes	yes	no
Customer Inquiries • Provide balance • Troubleshooting • Transaction history	yes	yes	yes (balance and history)	yes	no
Lost or stolen cards (linked only) • Update database • Download block transaction • Issue new card - by mail • Replace value	yes	yes	no	yes	no
Malfunctioning card • Update database • Receive bad card • Replace card by mail • Replace value	no	yes	no	no	no
Collect/update cardholder personal information and update database	yes	yes	no	yes	no
Enroll cardholder in automatic revaluing program • Mail signature authorization form to cardholders • Upon return, update database	yes	yes	yes	yes	no
Problem reporting • Manage and track • Update knowledge base and	yes	yes	no	yes	no

Activities	Agency (First Tier)			Contractor (Second Tier)	
	Call Center	Mail Center	Internet**	Call Center	Mail Center
help files					
Card refunds • Authorize refunds • Issue checks for approved refunds	yes	yes	no	no	no
Institutional programs • Respond to inquiries • Manage institutional and card accounts	yes	yes	yes	yes	no
Redirect fare policy, schedule and route inquiries to relevant agency	yes	no	yes	yes	no

\* Revalues handled through the call centers, mail centers and Internet will be downloaded to the revalue network.

\*\* The Internet website will be operated by the Contractor on behalf of the Agencies.

### 1.2.2 Call Center

- (a) The Contractor shall provide the RFCS equipment and services required for the Agencies to perform first tier customer service activities listed in Figure II-1.1 (DR 1.01). All call center equipment and services shall be operable in a “card not present” environment. The Agencies will provide facilities, local communications, existing financial management systems, and existing telephone, call management and interactive voice response systems.
- (b) The Contractor shall provide the equipment and services to receive, queue and manage calls transferred from any Agency’s call center to the Contractor for second tier customer service. Calls may be transferred through:
  - i. An Agency’s existing interactive voice response (IVR) or call management system or systems.
  - ii. Manual transfer of calls by an Agency customer service representative.
- (c) The Contractor shall provide a toll free staffed call center service which is available Monday through Sunday between the hours of 6 a.m. and 8 p.m. (Pacific Time) to accept calls and to perform second tier activities listed in Figure II-1.1.
- (d) Direct access to Contractor customer service and technical representatives shall be provided during staffed hours. Automated response technologies may be used during non-staffed hours, subject to approval by the Contract Administrator.



- (e) The call center shall have capabilities for transferring calls related to routing, fare, and other Agency specific issues to the relevant Agency for disposition. Automated response technologies shall include functions to transfer calls to specific Agencies.

### **1.2.3 Mail Center**

- (a) The contractor shall provide the equipment and services for a single agency, operating on behalf of the Agencies, to provide single card and batch mail center functions and fulfillment as indicated in Figure II-1.1 (DR 1.01).

### **1.2.4 Agency Customer Service**

The Contractor shall provide support services for Agency operated walk-in (CSO), telephone, and mail customer service facilities. A description of these services is contained in Section 6.II-5 "Clearinghouse Services."

### **1.2.5 Internet Website**

The Contractor shall describe their proposal for the establishment and operation of an Internet Website (DR 1.02) per the requirements listed below, indicating any variations, exceptions, additions or recommendations regarding the use of the Website for customer service.

- (a) The Contractor shall provide and operate an Internet Website on behalf of the Agencies.
- (b) The Website shall be designed for accessibility. Website publishing/accessibility guidelines will be provided by the Contract Administrator at Conceptual Design Review (DR 1.03). Additional information on web accessibility can be found at <http://www.w3.org/WAI/>.
- (c) The Contractor shall provide the equipment and services necessary for individual card and batch orders to be routed to and fulfilled by the Agency operating on behalf of the Agencies.
- (d) The Website shall be branded per the requirements of the Agencies, and shall be used solely for RFCS customer service (the site shall not be shared with non-RFCS agencies).
- (e) The Website shall be accessible through hotlinks on each Agency website, and shall include hotlinks back to each Agency website.
- (f) The Website shall provide the functions listed in Figure II-1.1. Only cards initialized as an "adult" shall be issued through the Website. All reduced fare cards shall only be issued through an Agency CSO or mail center.

- (g) The Website shall provide for Secure Electronic Transactions.
- (h) The Website shall maintain the privacy of all customer data and account parameters, allowing only authorized access.
- (i) The Contractor shall establish a separate Website page or pages to support institutional account management, and shall provide additional security to guard against unauthorized access. Authorized institutional account representatives shall be able to:
  - i. Access card usage statistics for all cards sponsored by the institution.
  - ii. Access subsidy utilization statistics (type of fare used for) for all cards sponsored by the institution.
  - iii. Order and issue new cards.
  - iv. Cancel cards (subject to RFCS policies).
  - v. Update subsidy amounts.
  - vi. Update cardholder personal information.
- (j) A designated agency shall act as the merchant of record for all Website card issuance and revalue functions.
- (k) Customers and institutions shall be able to establish a personal identification number (PIN) or password for access to account information.
- (l) Customer and institutions shall be able to change a PIN or password through the Website.
- (m) The Website shall include secure provisions to provide customer or institutional access to an account if a PIN or password is forgotten or lost, and provide a new PIN or password.

### **6.II-1.3 Performance Requirements**

#### **1.3.1 Call Center**

Comprehensive, responsive and accurate customer service is important for the success of the RFCS initiative.

- (a) The Contractor shall identify any assumptions regarding the allocation of first tier and second tier call center services.
- (b) The Contractor shall identify quantifiable quality standards and the level of service to be provided to RFCS customers for second tier support, and shall identify methodologies for measurement (DR

1.04). A minimum set of performance metrics for the call center operation is:

- i. Call center answer rates, number of rings
  - ii. Number of calls
  - iii. Number of calls answered and number dropped
  - iv. Reason for call
  - v. Average wait time
  - vi. Customer satisfaction assessment
  - vii. Accuracy of service (inquiry responded to correctly)
- (c) The Contractor shall provide regular (minimum monthly) measurement reports against the identified standards and level of service for second tier call center operation (CDRL 4).
- (d) The Contractor shall maintain a on-line knowledge database accessible for both first tier and second tier customer service, and shall update the database as new problems are detected and corrected (DR 1.05).
- (e) Customer service functions shall be completed in accordance with 1.3.1.(b). The Contractor shall meet the following minimum call center service performance standards.
- i. Fare cards revalued on the next daily download cycle following the request.
  - ii. Card, privilege, and application blocks completed on the next download cycle after receiving the request.
  - iii. Value replacement on linked cards within one business day from receiving the lost / stolen report.

### **1.3.2 Internet Website**

- (a) The Internet Website shall provide on-line access to card and account information, subject to security provisions.
- (b) The Contractor shall identify quantifiable quality standards for Internet Website operation (DR 1.06).
- (c) The Contractor shall provide regular (minimum monthly) measurement reports against the identified standards (CDRL 4).

### **6.II-1.4 New Card Fulfillment (Option)**

The Contractor shall propose an option to provide additional card fulfillment functions as follows:

- (a) The Agencies will be responsible for:
  - i. Fulfilling single card or small batch (<100 cards) over the counter orders.
  - ii. Fulfilling single card or small batch (<100 cards) telephone and mail orders received directly by an Agency.
  - iii. Establishing institutional program agreements and accounts.
- (b) The Contractor shall be responsible for:
  - i. Fulfilling single card orders received through the Internet website or by mail.
  - ii. Fulfilling initial institutional account orders placed by an Agency on behalf of an institution.
  - iii. Fulfilling large batch (>100 cards) orders place by an Agency, whether for that Agency or on behalf of a customer.
  - iv. Fulfilling institutional account re-orders received through the Internet website or by mail.
- (c) For orders fulfilled by the Contractor, the Contractor shall provide all card initialization, personalization and linking. The Contractor shall also set up institutional account parameters on cards distributed to institutions, subject to the agreement between the Agency and institution.
- (d) The Contractor shall accept all forms of payment for mail order card orders including cash, check, credit card, debit card, direct bank debit, and purchase order. The Contractor may accept reduced payment options through the Internet website.
- (e) For credit card and debit card sales, a designated Agency will act as merchant of record. The Contractor shall act on behalf of that Agency.
- (f) The Contractor shall be liable for non-payment of funds, except for Institutional Account payments governed by an agreement between an Agency and Institution.
- (g) The Contractor shall adhere to cash management practices per the requirements of the Washington Office of the State Treasurer and Office of Financial Management.
- (h) The Contractor shall deliver FOB destination single card orders within forty-eight (48) hours, small batch orders within seven (7) days, and large batch orders within fourteen (14) days.
- (i) All proposed fees shall be subject to approval by the Contract Administrator.

## 6.II-2 INSTITUTIONAL PROGRAMS

The term Institutional Program refers to arrangements between an Agency and an employment, educational, commercial or human service institution which provides for designated travel privileges for the employees/students/faculty/staff/clients of that institution on the transportation services of the Agency. Institutional programs and arrangements vary by Agency. A summary of the approximate number of institutional programs and annual fare media/dollar volumes is contained in Figure II-2.2 at the end of this section.

Under the RFCS, the Agencies will manage the Institutional Program and will continue as the primary contact for program participants, with responsibility for soliciting and managing institutional accounts. The Contractor shall be responsible for providing Institutional Program administrative support services on behalf of the Agencies including:

- Customer Service (per Section 6.II-1).
- Fare Card Management (per Section 6.II-4).
- Clearinghouse Services (per Section 6.II-5).
- Financial Management (per Section 6.II-7).
- Network Management (per Section 6.II-8).

Procedures for resolving payment disputes will be defined in the individual account agreements between the Agencies and the institution. The Agencies will bear the risk of loss in the event of non-payment by the institution.

Four overall Institutional Programs will be included in the RFCS:

- Employer.
- Commercial Account (WSF).
- Campus.
- Human Service.

These programs have core common functional requirements, as well as program-specific requirements. The Contractor shall support the full range of requirements for each program within the RFCS.

For all institutional programs, the system shall support pre- or post-billing options based on monthly, 3-month, semi-annual, or annual billing periods, as well as combinations of these alternatives. The billing period may not be the same as the pass period - e.g. an institution may purchase annual passes, but may have the cost of those

passes billed on a monthly basis for the number of passes in use. The system shall generate billing information for subsequent invoicing by a designated Agency or Agencies. Invoicing of the institution and collection of accounts receivable will be done by a designated Agency.

## 6.II-2.1 Institutional Program Descriptions

### 2.1.1 Employer Programs

Employer programs involve a financial subsidy by employers for travel on one or more Agency services by their employees. Three (3) different employer programs shall be provided by the Contractor in the RFCS, corresponding to existing employer program types as summarized in Figure II-2.1.

**Figure II-2.1: RFCS Employer Programs**

New RFCS Employer Program Type	Existing Employer Program Type
1. Right-to-Ride	<ul style="list-style-type: none"> <li>FlexPass</li> </ul>
2. Electronic Voucher	<ul style="list-style-type: none"> <li>Commuter Bonus Voucher</li> <li>Pre-Paid Pass</li> </ul>
3. Customized Products	<ul style="list-style-type: none"> <li>Direct Pass Sales</li> <li>Direct Ticket Book Sales</li> </ul>

Travel may be on regular routed service, paratransit, and/or vanpools. For vanpools, financial subsidies shall be applied directly to the specific vanpool designated by the institution. The Contractor shall coordinate with and report vanpool subsidies to the vanpool administrator at the participating Agency(s).

The Contractor shall also provide options to develop new programs in the future, including programs that combine features of those listed in Figure II-2.1.

#### 2.1.1.1 Right-to-Ride Pass (e.g. FlexPass)

The right-to-ride pass shall provide for unlimited use pass privileges by employees of an institution on one or more Agency public transportation systems. The pass privileges will remain in effect until canceled by the employer or Agency.

Data shall be collected for each pass transaction, and may be used to compute the basis for payment by the employer. Survey or other data may also be used to determine payment basis.

The RFCS shall provide two right-to-ride pricing alternatives:

1. **Flat Rate Pricing.** The Agency and employer negotiate a flat rate price for all Agency passes (price will vary by Agency), and update the price annually. Data on actual use (recorded pass transactions) of Agency services in the previous period is used to update the negotiated flat rate price for the following period.
2. **Per Trip Pricing.** The Agency and employer negotiate a price per trip. Employers are billed based on the actual use (recorded pass transactions) of the Agency service at the agreed per-trip price.

#### 2.1.1.2 Electronic Voucher

An electronic voucher is the fare card equivalent of the current employer sponsored Commuter Bonus Voucher. This program shall provide for a fixed dollar amount subsidy to be distributed monthly to participating employees. The subsidy is valid for stored value or pass purchase on any Agency public transportation service at the discretion of the employee.

The actual amount of the subsidy shall be configurable by individual employee or groups of employees (e.g. one group may receive a \$25 subsidy while another may receive a \$50 subsidy).

The RFCS shall include the capability of canceling unredeemed vouchers under the following circumstances:

- (a) At the direction of the Agencies in the event of non-payment by the institution.
- (b) If the voucher has not been redeemed within a period specified by the Agencies (e.g. 90 days). In this case, unredeemed value shall be credited to the institution account.

**2.1.1.2 Customized Products**

Customized products refers to the loading of a specified pass or stored value amount directly to a card or series of cards through any RFCS revalue option.

An Agency or Institution shall be able to designate (order) the product(s) to be loaded, with the card automatically revalued when presented at any revalue point in the network. If the product has not been loaded within a period specified by the Agencies (e.g. 90 days), the product shall be canceled and unredeemed value credited to the institution's account.

**2.1.2 Campus Program**

Several Agencies have arrangements with local universities and colleges to provide faculty, staff and students with public transportation privileges in a program that is cost shared with the faculty/students/staff.

The Contractor shall provide an RFCS fare card Campus Program solution that provides public transportation privileges negotiated between the Agencies and campus, and is convenient for faculty, student and staff participants. The program shall be extensible to other campuses and academic institutions, including universities, community colleges, and potentially public schools.

**2.1.3 Human Service Program**

Human Service programs currently offer two types of public transportation benefits for qualified clients:

1. Issuance of a period pass for clients who qualify for ongoing public transportation benefits.
2. Issuance of one or more tickets valid for a single trip each. These are for clients who qualify for specific short-term public transportation benefits only.

The Contractor shall implement a fare card Human Service subsidy for clients who qualify for ongoing public transportation benefits. Alternatives shall include those listed in Section 2.1.1 for employer programs.

The Contractor shall also provide disposable smart card options for single-trip/short term travel for Human Service Agency clients.



## 6.II-2.2 Functional Requirements

### 2.2.1 Common Institutional Program Requirements

The Contractor shall support the following requirements that are common to all of the Institutional Programs (DR 2):

- (a) The Contractor shall initialize all fare cards for Institutional Program participants with the appropriate customized parameters applicable to the Institution and program, subject to the provisions of 6.II-4.2.1.
- (b) The Contractor shall utilize Institutional Account identification numbers supplied by the Agencies.
- (c) The Contractor shall distribute initialized fare cards to a designated Agency responsible for redistribution to the institutions. The institution will issue cards to the individual card holders.
- (d) The Agencies shall be provided with functions, systems and services to complete initialization and distribute fare cards to the institutions.
- (e) The Contractor shall provide program support to the institutions including:
  - i. Customer Service (per Section 6.II-1) including telephone and Internet support.
  - ii. Fare Card Management (per Section 6.II-4).
  - iii. Clearinghouse Services (per Section 6.II-5).
  - iv. Financial Management (per Section 6.II-7).
  - v. Network Management (per Section 6.II-8).
- (f) The Contractor shall implement on-going changes to the transportation programs of individual institutions as directed by the Agencies. These changes shall include:
  - i. The addition or deletion of cardholders to the program.
  - ii. Changes to the defined fare payment options.
  - iii. Changes to the designation of the applicable Agency services.
  - iv. Changes to the billing cycle.
  - v. Cancellation and credit back of unused voucher subsidy or fare products.
  - vi. Changes in the amount of the institution subsidy for immediate or a future effective date.

- vii. Blocking of designated fare cards to prevent further use of the Institutional Program application or the entire card.
  - viii. Un-blocking of the Institutional Program application for employees/students/staff/clients who have re-joined the program.
- (g) The Contractor shall provide the revalue options identified in Section 6.II-9 for institutional program cardholders.
- (h) The Contractor shall be responsible for all transaction data processing required to support the billing for Institutional Programs.
- (i) The Contractor shall provide a single consolidated invoice or billing information to a designated Agency for invoicing to the institution as follows:
  - i. Payment may be pre- or on a post-usage basis based on monthly, 3 month, semi-annual, annual, or a combination of these periods at the direction of the Agency(s).
  - ii. Flexible billing options shall be provided that allow the institution to pay over time (e.g. partial billing monthly; 50% @ 30 days, 50% @ 90 days, etc.).
  - iii. Billing options shall be at the direction of the Agencies for specific institutions.
  - iv. The bill shall be broken down by Agency, transaction volume, type of transaction, and cost.
  - v. A penalty shall be applied to any outstanding balance due for that invoice. The penalty shall be fixed at a rate not to exceed that allowable under State of Washington law. Any payment not received by the clearinghouse within thirty (30) days of receipt of a billing invoice is past due.
- (j) The Contractor shall provide the following mechanisms for an institution to manage and update card accounts, and order/update products:
  - i. A secure Internet Website as described in Section 6.II-1.2.5.
  - ii. Through transfer of an electronic file of card serial number, privileges and products.
- (k) Card and account management and update features shall include:
  - i. The capability to link card serial numbers with employee/student/faculty/staff/client ID numbers or other identifying information. For Human Service accounts, a

linkage shall also be provided to the identifying information for the caseworker.

- ii. The capability of transmitting program changes to the clearinghouse system on a scheduled and un-scheduled basis.
  - iii. The ability to generate reports from the clearinghouse database on the use of the program by their employee/student/faculty/staff/clients, and the status of all cards, voucher subsidies, and product loads.
- (l) The Contractor shall provide campus and human services institutions with the capability to carry out fare card imprinting with logos/graphic information and/or employee/student/staff/client photographs.
  - (m) The Contractor shall provide systems and procedures to maintain confidentiality and privacy on the use of individual fare cards, to be accessible only by the Agencies or institution.

## **2.2.2 Specific Institutional Program Requirements**

### **2.2.2.1 Right-to-Ride Program (DR 2.01)**

- (a) The Right-to-Ride Program fare card shall be initialized to indicate the program type and as an unlimited use pass on one or more Agency transportation services.
- (b) Right-to-Ride cards shall have the capability of establishing a limit on fare transaction value (policies to be established by the Agencies and Institution).
- (c) An employee may add additional value to his/her fare card at any device in the revalue network, to enable the fare card to be used as fare payment for the services provided by other Agencies not covered by their employer's program.
- (d) Agreements between the Agencies and institutions may include other products and services that are billed directly by the Agencies. Billing for RFCS products shall be separate from that of other products and services.

### **2.2.2.2 Electronic Voucher Program (DR 2.02)**

- (a) The Electronic Voucher Program fare card shall be initialized to indicate the program type, the amount of the monthly revalue subsidy and the effective date of the beginning of the monthly period.

- (b) The monthly period may be set by individual employers and need not be based on a calendar month.
- (c) When an employee revalues his/her fare card at any revalue point in the network, the subsidy amount shall be deducted from the gross cost of the revalue. The subsidy is applied towards transportation services for fare payment options selected by the employee. The remaining revalue amount is paid by the employee at the revalue point.
- (d) The subsidy will be applied only once a month and will be activated at the beginning of the effective period.
- (e) The subsidy shall be canceled and the value credited to the institution account if not redeemed within a pre-defined timeframe (variable parameter to be determined by the Agencies).

#### 2.2.2.3 Customized Product Program (DR 2.03)

- (a) An institution shall be able to order specific RFCS passes or stored value amounts for identified cards.
- (b) The RFCS shall automatically load the specified pass or stored value amount at any revalue point in the network when the card is presented.
- (c) The product shall be applied only once.
- (d) The product shall be canceled and the value credited to the institution account if not redeemed within a pre-defined timeframe (variable parameter to be determined by the Agencies).

#### 2.2.2.4 Campus Program (DR 2.04)

- (a) The Campus Program fare card shall be initialized to indicate the program type and as an unlimited use pass on a designated Agency transportation service or services, and may have an activation date which defines when the privilege will begin and/or an expiry date which defines when the privilege will end.
- (b) Students/staff/faculty who decline to participate in the program shall have the Campus Program function blocked on their fare card. Participants who decide to re-join the Campus Program shall have the Campus Program function un-blocked on their fare card. These changes shall be accomplished without requiring the affected students or staff to present their fare card to a revaluing device.

- (c) A student/staff/faculty member may add additional value to his/her fare card at any device in the revalue network, to enable the fare card to be used as fare payment for the services provided by other Agencies not covered by their Campus Program.
- (d) The subsidy shall be canceled and the value credited to the institution account if not redeemed within a pre-defined timeframe (variable parameter to be determined by the Agencies).

#### 2.2.2.5 Human Service Programs (DR 2.05)

- (a) Human Service Agencies shall have the ability to issue cards and provide transportation benefits to clients (customers) as follows:
  - i. By issuing an unvalued fare card and using the Internet Website to order the voucher or fare product to be loaded, or register the card for Right-to-Ride privileges, with the card updated the next time it is presented at a revalue location or FTP. It is expected that the Customized Product option will be the most widely used.
  - ii. By issuing pre-valued disposable smart cards from a stock maintained in the Human Service Agency office.
- (b) The Internet Website shall also be used for:
  - i. Ordering replacement fare card or disposable card stock. Orders shall be forwarded to a designated Agency for fulfillment, and associated with the specific Human Service Agency office placing the order.
  - ii. Card and account management and reporting functions for caseworkers and supervisors. Different levels of account management and access shall be provided for caseworkers and supervisors, to be determined at Final Design Review (CDRL 3).
  - iii. Associating a card serial number with a Human Service Agency client ID number.
- (c) Billing/invoicing information shall be generated by specific Human Service Agency office.
- (d) Electronic files (ASCII flat file format) of billing/invoice information shall be generated for the designated Agency that invoices the Human Service Agency.
- (e) The Internet Website shall allow a card to be “de-associated” from the Human Service Agency when benefits have expired, and used by the customer as a general public RFCS card.

### 6.II-2.3 Performance Requirements

The Contractor shall provide implementation solutions for the Institutional Programs which:

- (a) Automate program administration to the extent feasible, and provide the necessary software, training and other systems for automation.
- (b) Reduce administrative effort for the participating institutions, including establishing the program, administering individual cardholder changes, and billing.
- (c) Provide timely and easily accessible data on the use of Agency services by employee/student/faculty/staff/client participants. This includes both summary and individual card use data.
- (d) Are suitable for both large and small institutions.
- (e) Allow the institution to include other, non-transportation applications on the card to support other aspects of their business.

### 6.II-2.4 Invoicing and Funds Collection Services (Option)

The Contractor shall propose an option to provide additional institutional program invoicing and funds collection services on behalf of the Agencies as follows:

- (a) The Contractor shall provide invoicing and funds collection on behalf of the Agencies for employer, commercial account, campus and human service programs. The Agencies will bear the risk of loss of unpaid funds, provided that the Contractor exercises reasonable efforts to collect funds and mitigate such loss.
- (b) The Agencies shall retain contractual arrangements and authority with institutions regarding program operation, pricing and obligations.
- (c) Institutions shall be provided with pre-and post-payment options per the direction of the Agencies.
- (d) Invoices shall be generated by institution and specific office or location, and shall include all RFCS products, value and amounts owing during the invoicing period.
- (e) The Contractor shall provide A/R and A/P support to institutions through the Internet website, telephone and mail.
- (f) All receivables shall be maintained at thirty (30) days or less.

- (g) In the event that a receivable governed by an Agency-Institution agreement extends beyond 30 days, the Contractor shall notify the Agency within two (2) business days.
- (h) The Contractor shall adhere to cash management practices per the requirements of the Washington Office of the State Treasurer and Office of Financial Management.
- (i) All proposed fees shall be subject to approval by the Contract Administrator.

Figure II-2.2: Estimated Institutional Programs and Media Volumes

Current Account Type	Approximate # of Accounts	Approximate Annual Volumes (Notes 1,2)
<b>Community Transit</b>		
1. Employer Accounts		
• Monthly Passes	14	18,000 passes
• FlexPass	-	Included in KCM #'s
2. Ed Pass (campus)	1	Max 10,000 passes per quarter
3. Campus Card	-	Included in KCM #'s
<b>Everett Transit</b>		
1. Employer Accounts		
• Monthly and WSF/ET passes	5	10,000 passes
• Consignment Passes	5	1700 passes
2. Human Service	20	500 passes
<b>King County Metro</b>		
1. Employer Accounts		
• Pre-paid Passes	300	40,000 passes
• Consignment Passes	200	350,000 passes
• FlexPass	125	90,000 passes
• Commuter Bonus Voucher	400	\$2,600,000
2. Campus Card	2	60,000 passes
3. Human Service	130	60,000 ticket books
<b>Kitsap Transit</b>		
1. Employer Accounts		
• Consignment Passes	26	4,400 passes
2. Human Service	6	5,800 passes
<b>Pierce Transit</b>		
1. Employer Accounts		
• Consignment Passes (Note 1)	105	87,000 passes
2. Human Service	6	4,000 passes
<b>Washington State Ferries</b>		
1. Employer Accounts		
• Pre-paid Passes	18	700 passes
• Consignment Passes	15	4,400 passes
• Commuter Bonus Voucher	4	\$1,800
2. Commercial Accounts	1,980	168,000 transactions \$6,000,000

Note 1: Does not include youth passes.

Note 2: Includes Puget Passes.



**6.II-3 CARD PROCUREMENT AND DISTRIBUTION****6.II-3.1 Card Procurement and Distribution Description**

- (a) The Contractor shall procure fare cards and disposable fare cards on behalf of the Agencies in accordance with the specifications in Section 6.III-2 (DR 3).
- (b) Cards shall be procured in sufficient quantity to provide the most favorable cost to the Agencies and to meet the demands for fare cards throughout the region. The Agencies will provide demand forecasts for cards.

**6.II-3.2 Functional Requirements****3.2.1 RFCS Card Procurement**

- (a) The Contractor shall provide RFCS cards according to the specifications defined in Division III, Section 6.III-2.
- (b) The base cards shall be procured with the specified artwork and logo of the RFCS program.
- (c) Upon receipt of the card order by the Contractor, the chip shall be loaded with the RFCS application and security keys (initial initialization).
- (d) Quality assurance measures shall be implemented by the Contractor to ensure that a card batch meets the quality and performance standards defined in Section 6.III-2.
- (e) Defective cards shall be returned to the manufacturer and replacements procured by the Contractor.

**3.2.2 RFCS Card Distribution**

- (a) The Contractor shall distribute cards to a designated central inventory and fulfillment location as designated by the Contract Administrator.
- (b) Cards shall be shipped to the designated Agency central location in a blocked condition.
- (c) Card orders shall be accompanied by (DR 3.01):
  - i. Order confirmation and invoice or purchase order reference.
  - ii. A packing slip and other shipping documents as required.
  - iii. Back order and/or replacement card information.

- iv. Quality assurance test results and card defect statistics.
  - v. An electronic file cross-referencing electronic serial numbers with printed card serial numbers.
  - vi. Other data as required in paper and electronic form for central Agency inventory control.
- (d) The Contractor shall be responsible for the physical security of inventory and risk of loss until received at the designated Agency location.
- (e) The Contractor shall be responsible for all shipping and insurance costs.

### **3.2.3 RFCS Card Inventory Management**

- (a) The Contractor shall be responsible for managing RFCS Card inventory prior to shipment to the designated Agency location.
- (b) Upon receipt of card stock from the manufacturer and initial card initialization, the Contractor shall record all card serial numbers in the RFC system.
- (c) The Contractor shall provide statistical reports detailing the procurement and distribution of cards.

### **6.II-3.3 Performance Requirements**

- (a) Cards shall be delivered to the designated central inventory location within sixty (60) days of ordering.

### **6.II-3.4 Additional Card Procurement and Inventory Functions (Option)**

The Contractor shall propose an option to provide additional card procurement and inventory functions as follows:

- (a) The Contractor shall maintain the central inventory of RFCS fare cards and disposable cards.
- (b) The Contractor shall be responsible for distributing card inventory to Agency customer service offices and other designated card issuance locations.
- (c) The Contractor shall accept card orders from an Agency or other designated card issuance location.
- (d) The Contractor shall be responsible for providing all card initialization, personalization and linking functions for cards and card batches issued by the Contractor. The Agencies will provide final setup and card personalization for cards distributed through Agency customer service offices.

- (e) The Contractor shall track all card inventory from procurement through issuance.
- (f) The Contractor shall monitor card stock at all issuance locations, and notify the issuance location when minimum inventory levels are reached.
- (g) The Contractor shall maintain the physical security of cards until distributed to issuance points.
- (h) The Contractor shall prepare monthly reports of the procurement and distribution of all card inventory.
- (i) The Contractor shall deliver FOB destination single card orders within forty-eight (48) hours, small batch orders (<100 cards) within seven (7) days, and large batch orders (>100 cards) within fourteen (14) days.
- (j) All proposed fees shall be subject to approval by the Contract Administrator.

### **6.II-3.5 Local Inventory System (Option)**

The Contractor shall propose an option to provide the Agencies with the ability to access and use the Contractors inventory system for local inventory management of fare cards as follows:

- (a) The inventory system shall provide capabilities for a designated Agency to receive, manage, track and distribute central card inventory at a designated central distribution point in the Central Puget Sound Region.
- (b) The inventory system shall provide capabilities for each Agency to receive, manage, track and distribute card batches shipped to local agency distribution sites.
- (c) The inventory system shall provide capabilities for the central card inventory site or local Agency sites to track and distribute cards sent to card issuance locations.
- (d) The inventory system shall be integrated with inventory capabilities of the Customer Service Terminal, and shall be updated as cards are received and issued at card issuance locations.

## **6.II-4 FARE CARD MANAGEMENT**

### **6.II-4.1 Fare Card Management Description**

The RFCS application is a specific set of functions which will be enabled through use of the RFCS fare card and which the Contractor shall support according to the terms of this Contract. Additional applications may optionally be loaded on the card which will require additional storage capacity and capability. This section describes the information and functionality that the Contractor shall support for the RFCS application.

Through the Customer Service Terminal (Section 6.III-10), Internet website (as applicable), or electronic data transfer from other systems, the Contractor shall provide the software and services necessary for card management functions, which includes tracking all distributed cards, maintaining a current status and history of card use, maintaining a database of information contained on the card and maintaining current account balances for each card (DR 4).

### **6.II-4.2 Functional Requirements**

#### **4.2.1 Card Initialization**

- (a) The Contractor shall provide the capability to unblock a card and complete the initialization process at the time of issuance. Card initialization parameters shall include at a minimum:
  - i. Fare category, privileges, and other cardholder-specific information
  - ii. Automatic revalue provisions
  - iii. Institutional account ID, parameters and options
- (b) The Contractor shall provide the equipment and systems at each Agency card issuance point to:
  - i. Initialize RFCS cards in response to call center, mail-in or Internet new or replacement card orders.
  - ii. Initially value the card and distribute via mail.
  - iii. Supply the replacement value of a lost, stolen, or defective linked card or defective anonymous card, and restore the card to its previous status and privileges.
  - iv. Link the card with cardholder specific data at the cardholder's request.
  - v. Update card inventory status in the RFC system at the time of issuance.

**4.2.2 Card Information**

The card management system shall, at a minimum, include the following information, and shall have capabilities to add additional data elements in the future (DR 4.01). These are data elements that it is envisioned will be recorded and stored by the clearinghouse system. The data elements to reside on the card are described in Section 6.III-2.4.3.

- (a) Each card shall have a unique card identifier.
- (b) Card Status
  - i. Initialized / un-initialized
  - ii. Card Block / unblock
  - iii. Application or function block / unblock
  - iv. Linked / anonymous
  - v. Date issued
- (c) Card Privileges / Options / Restrictions
  - i. Automated revalue
  - ii. Maximum card value
  - iii. Limited routes / periods of usage
  - iv. Bonus programs
  - v. Frequent user programs
  - vi. Other applications
  - vii. Eligibility for guaranteed ride home
- (d) Fare Category
  - i. Adult (Base)
  - ii. RRFP (Permanent and temporary w/expiry date)
  - iii. Low income and low income family (for KT)
  - iv. Date of birth (for automated fare group management and “youth” fare)
  - v. WSF vehicle types
- (e) Card Ownership
  - i. Other institutions
- (f) Linking Information
  - i. PIN (number or password)
  - ii. Name (not on fare card - only in central database)

- iii. Address (not on fare card - only in central database)
- iv. Phone number (not on fare card - only in central database)
- v. Photo (RRFP, institutional programs as required)
- vi. Physician's name (RRFP; not on fare card – only in central database)
- (g) Card Transaction History
  - i. Fare payments and transfers (minimum previous twenty in the database)
  - ii. Status/options/privilege changes
- (h) Automatic Revalue Information
  - i. Revalue threshold
    - Period pass – type, validity/activation date, and expiration date
    - Stored value - dollar amount
    - Electronic Voucher – dollar amount
  - ii. Credit card account number (not on fare card - only in central database)
  - iii. Debit card account number (not on fare card - only in central database)
  - iv. Direct debit bank information (not on fare card - only in central database)
  - v. Autoload (Electronic Voucher or Customized Product) status – pending, loaded, expired (not on fare card – only in central database).
- (i) Not Sufficient Funds (NSF) History
- (j) Current Account Balances
  - i. Stored value (dollar value with a configurable maximum). The Contractor may identify a maximum purse value consistent with their business strategy.
  - ii. Passes (fixed period [e.g. day pass, weekly pass, two week pass, calendar month, etc.] or rolling period [e.g. 7, 14, 28, 30, 90, 365 days, etc.]

#### 4.2.3 Card Management

- (a) The Contractor shall maintain the central electronic database of all RFCS card accounts. The database shall be maintained while the

card is in active status or for a minimum ninety (90) days, whichever is greater, before archiving.

- (b) The Contractor shall describe processes for accessing archived card account data (DR 4.02).
- (c) The Contractor shall provide a database structure to meet all card management requirements.
- (d) The Contractor shall provide software and systems to access card accounts for additions, updates, and queries.
- (e) Specific card management requirements shall include:
  - i. Establish cardholder account at card issuance.
  - ii. Establish cardholder account for card replacement.
  - iii. Cardholder value replacement for malfunctioning card.
  - iv. Cardholder linking for those customers choosing to link their cards.
  - v. Maintain cardholder options and privileges.
  - vi. Maintain current card account balance.
  - vii. Maintain card transaction history.
  - viii. Maintain card application and configuration information.

#### **4.2.4 Privacy**

The Contractor shall implement systems and procedures which are consistent with Agency public disclosure policies, and that ensure the privacy of cardholder personal information. The systems and procedures shall also ensure the privacy of the card owner, in the event that the card owner is different than the cardholder.

#### **6.II-4.3 Performance Requirements**

- (a) The Contractor shall initialize and distribute cards within one (1) working day of request.
- (b) The Contractor shall implement quality assurance steps which ensure the accuracy of information stored on the card and in the database. Quality assurance steps are subject to approval by the Contract Administrator.
- (c) Contractor shall track and manage card failure rates per the requirements of Section 6.III-2.

- (d) All card updates shall be transmitted to the revalue network and data acquisition systems within twelve (12) hours of recording of the transaction by the clearinghouse system.



**6.II-5 CLEARINGHOUSE SERVICES****6.II-5.1 Clearinghouse Services Description**

The clearinghouse services includes the central management and control functions necessary to implement and operate the RFCS. The following is a summary list of these responsibilities.

- Provide transaction processing, and act as final transaction acquirer and processor of all system transaction activity.
- Reconcile and settle all transactions.
- Manage data upload and download between the clearinghouse system and all end points.
- Manage system interfaces and all end points.
- Manage fare table updates.
- Detect and manage fraudulent activity.
- Provide the central database for system reporting, and provide standard and ad-hoc (user defined) reports to RFCS participants.
- Maintain and operate all central clearinghouse system databases required for RFCS operations.
- Provide and support system audit.

**6.II-5.2 Functional Requirements****5.2.1 Transaction Processing****5.2.1.1 General Processing Requirements**

The Contractor shall provide the following general processing functions.

- (a) Complete audit trail of all system activity.
- (b) Database backup, reorganizations, tuning, and other necessary database management functions.

### 5.2.1.2 Daily Transaction Processing Functions

The Contractor shall provide the following daily transaction processing functions (DR 5.01):

- (a) Financial reconciliation
- (b) Settlement
- (c) Reports
- (d) Card initialization processing
- (e) Card account management including at a minimum escheat, dormancy, stale accounts, write-offs, adjustments
- (f) Credit / debit revalue transactions
- (g) Cash management activity (such as settlement with credit / debit networks, check processing and clearing, other payment processing, matching receipts with revalue transactions. See Section 6.II-7.)

### 5.2.1.3 Daily Processing Cycle

- (a) The Contractor shall provide systems, software, and on-going operations to meeting all clearinghouse system processing requirements.
- (b) The RFCS shall operate on a daily processing schedule 7 days per week, 365 days per year.
- (c) At a minimum of once per day, all transactions shall be uploaded to the clearinghouse system from the transaction endpoints. Upload times shall be at the direction of each Agency according to their individual business operations.
- (d) Once database updates are completed, the following daily processing cycle functions shall be performed:
  - i. Revenue reconciliation and settlement. The Contractor shall define a schedule to provide next day settlement to all Agencies.
  - ii. Report generation and management services. Reports shall be available by the next day.
  - iii. Data download to respective endpoints; e.g. reports to Agencies, ACH file to settlement bank, blocks, function blocks, fare table changes, parameter table changes, etc. to

DACs, and other revalue devices. All downloads shall be completed by 4 a.m. Pacific time the following morning.

- (e) The Contractor's daily business cycle shall not end before 6 p.m. Pacific time.
- (f) The Contractor's daily business cycle shall not impact existing CSO operations and daily processing.
- (g) The Contractor shall map RFCS transactions to each Agency's daily business cycle irrespective of the clearinghouse system business cycle.

### **5.2.2 Reconciliation and Settlement**

- (a) The Contractor shall, at the end of each twenty four hour business cycle, close out the day's activity, reconcile account balances, calculate revenues due each participating Agency, and initiate settlement funds movement to and from designated Agency accounts (DR 5.02).
- (b) Settlement to the Agencies shall be done on a cash basis per the requirements of Section 6.II-7.
- (c) The RFCS shall provide next business day settlement of available funds.
- (d) Settlement data shall be transmitted to the Agencies by 6 a.m. Pacific time the following business day
- (e) Transactions shall not be settled until the revenue for the transaction is received (or memo posted in the event funds are received and held in an Agency account) by the clearinghouse system.
- (f) Daily fare reconciliation shall take into account all transactions with a financial impact. This shall include as a minimum:
  - i. Revalue transactions.
  - ii. Fare payment transactions.
  - iii. Revalue and fare payment cancellation.
  - iv. Value replacement for lost and stolen cards.
  - v. Adjustments, escheatment and write off transactions.
  - vi. Payments from institutional programs.

- (g) The Contractor shall reconcile daily all fee revenue paid to or received from acquirers and/or financial networks, deposits/fees held for RFCS cards, and interest earned on RFCS funds.
- (h) The Contractor shall initiate daily settlement transactions to each Agency. The Contractor shall use a method for settlement, such as ACH or wire transfers or intra-bank money transfers.
- (i) Daily reconciliation shall provide the following:
  - i. Reconcile daily batch totals to transaction totals.
  - ii. Reconcile all daily receipts to accounts receivable (revalue network, credit and debit networks, institutional programs).
  - iii. Reconcile cardholder account balances, the beginning balance, the net value of all transactions posted to the account, and the ending account balance.
  - iv. Reconcile the total value of fare revenue due to participating Agencies to the value of fare revenue recognized for the processing day.
  - v. Reconcile the total funds due from participating institutional programs to the appropriate fare card applications.
  - vi. Reconcile the total funds entering, exiting, and remaining in the system each day.
  - vii. The Contractor shall calculate the daily settlement due each Agency. Specific revenue sharing processing rules shall be provided to support this calculation, but at a minimum, the following shall apply:
    - Revenues are settled based on number and type of transactions.
    - Each Agency is allocated revenue for stored value fares at the time of fare payment.
    - Each Agency is allocated revenue from period pass revalues at the time of the revalue transaction, based on a pre-defined allocation formula.
    - For Sound Transit service area passes, revenue is allocated at the time of the revalue transaction per a pre-determined formula. Subsequent adjustments to revenue allocation may be made based on actual trip data.
    - Fares involving transfers between systems are shared between the affected Agencies.

- Interest earned on RFCS funds is shared between Agencies with a formula to be determined by the Agencies.
- (j) The Contractor shall compute, on a daily basis, the allocation of costs to each Agency according to formula provided by the Agencies.
- (k) The Contractor shall administer a claims fund held in an account designated by the Contract Administrator (DR 5.03). The claims fund shall be used to settle revenue for lost transactions or transactions that otherwise cannot be reconciled.

### **5.2.3 Data Upload and Download (DR 5.04)**

#### **5.2.3.1 General Upload and Download Management**

The Contractor shall provide the following data upload and download management functions:

- (a) Creation of batch files.
- (b) Batch validation and management
  - i. All batches received
  - ii. Required software version loaded
  - iii. Validate source of batch
  - iv. Duplicate detection
  - v. Batch consistency (details match header data)
  - vi. Batch data archive
  - vii. Security enforcement
- (c) Transaction validation and management
  - i. Data field edit checks
  - ii. Transaction consistency checks
  - iii. Validity of card serial number
  - iv. Validity of card status
- (d) Execute any exception / error handling processes
- (e) Update database
- (f) Post account balances
- (g) Management of upload and download processes

- i. Implementation of security processes
- ii. Re-transmission as necessary
- iii. Assurance that all endpoints have received downloads

#### 5.2.3.2 Data Upload (Transaction Acquiring)

RFCS is envisioned primarily as an off-line accountable system with transaction data being collected by remote processors or transaction devices, assembled in transaction batches, and depending on the specific interface, but typically once per twenty four hours, is submitted to the clearinghouse system.

The Contractor shall be responsible for accurate and timely acquiring of at least the following transaction batches. In addition, there are on-line interface requirements for certain administrative transactions between the central system and the customer service offices and the Contractor's call center.

- (a) Off-line batch transactions shall include:
  - i. Fare payment transactions
  - ii. Revalue transactions
  - iii. Cancellation and reversal transactions
  - iv. Confirmation of blocks, option changes, and revalues
  - v. Fare table updates
  - vi. Credit and debit card settlement files
- (b) Administrative transactions - both on-line to central system database and in off-line batch transaction mode - shall include:
  - i. Account set up
  - ii. Initialize and issue fare cards
  - iii. Updates to account information
  - iv. Balance inquiries
  - v. Revalue cards
  - vi. Provide card balance information
  - vii. Provide previous transaction information
  - viii. Report lost/stolen or malfunctioning cards - card and function block
  - ix. Function and card Unblock
  - x. Change cardholder options / privileges
  - xi. Card replacements (restore balance)

- xii. Collect/update cardholder personal identifying information
  - xiii. Link fare card using a PIN
  - xiv. Enroll in automatic revaluing program
  - xv. Process customer initiated (phone and mail) revalue requests
  - xvi. Problem reporting
  - xvii. Authorize card value refunds and replacements
  - xviii. Card value adjustments
- (c) The Contractor shall provide capabilities for the management of all batch transaction interfaces including:
- i. Schedule for uploading all end points requiring batch data transfer uploads to the clearinghouse system.
  - ii. Procedures for upload management - ensure integrity
  - iii. Process to guarantee successful uploads from all end points according to the pre determined schedule. The process shall include error handling, retransmission protocols, acknowledgments, data reconciliation procedures, batch validation.
  - iv. Duplication detection - batch management and tracking
  - v. Secure logging of all incoming transactions and a complete audit trail of all activity.
  - vi. Backup procedures for daily uploads in the event the primary procedure is unavailable or fails.
- (d) The Contractor shall implement and operate an on-line interactive transaction interface to support CSOs and the call center operation. This interface shall be used for the set of administrative transactions listed above.

#### 5.2.3.3 Data Download (From Clearinghouse System)

- (a) The Contractor shall transmit on a scheduled basis information to the end points necessary for operations.
- (b) The Contractor shall provide a solution which minimizes the time frames between when new card or function blocks and automated revalues are processed at the central system and are available at the point of service.
- (c) Devices receiving transmissions from the clearinghouse system shall include as a minimum:
  - i. DACs

- ii. Fare Transaction Processors
  - iii. RFCS equipment installed in Sound Transit TVMs.
  - iv. Agency CSOs and the call center
  - v. Other devices in the revalue network
  - vi. Agency back-office systems
  - vii. Institutional Program participants
  - viii. Settlement bank
- (d) The following types of transactions and information flow shall be supported:
- i. Function and card blocking and unblocking
  - ii. Revalue orders including electronic vouchers or voucher updates, and fare products (passes, stored value).
  - iii. Fare tables
  - iv. Reversals of automatic revalues
  - v. Privilege and option changes / cancellations
  - vi. Reports
  - vii. Transaction logs
  - viii. Database off load
  - ix. ACH settlement transactions
- (e) The Contractor shall provide capabilities for the management of all download interfaces.
- i. Schedule for downloading to all end points.
  - ii. Procedures for download management - ensure integrity.
  - iii. Process to guarantee successful downloads to all end points according to the pre-determined schedule. The process shall include error handling, retransmission protocols, acknowledgments, data reconciliation procedures, batch validation. The Contractor shall develop procedures to ensure that all fare table and other operational parameter changes are downloaded and installed in all FTP and revalue devices in accordance with the schedule requirement for their implementation.
  - iv. Duplication detection - download batch management and tracking.
  - v. Complete audit of all outgoing transactions.
  - vi. Backup procedures for daily downloads in the event the primary procedure is unavailable or fails.



- (f) The Contractor shall be responsible for initiating and processing credit and debit card approval transactions based on incoming automatic and customer requested revalue transactions.

#### **5.2.4 System Interface and End Point Management (DR 5.05)**

##### **5.2.4.1 Systems Interfaces and End Points**

The Contractor shall design, implement and support the following systems interfaces between the clearinghouse system and the following RFCS end points.

- (a) Data Acquisition System - Upload fare payment transactions, automated revalues, block and revalue acknowledgments. Download blocks, unblocks, revalues, status or privilege changes, fare tables, and other operational parameter data as required.
- (b) Revalue network and Fare Transaction Processors - Upload revalue transactions and fare card re-supply requests. Download fare tables and other operational parameter data as required.
- (c) Customer Service Terminals - Provide on-line transaction interfaces for administrative functions.
- (d) Agency Back Office Integration Application - receive Agency fare table updates, send reports and Agency specific transaction data for further analysis.
- (e) Call Center - provide customer service functions by the Contractor.
- (f) Institutional Programs - receive card initialization requests, card cancellations, function and card blocks, and manage billing, payments and reporting.
- (g) Commercial Credit Card Network - act as merchant acquirer to receive on-line authorizations for credit card revalue purchases and to receive financial settlements.
- (h) Debit Card Network - act as merchant acquirer to receive on-line authorizations for debit card revalue purchases and to receive financial settlements.
- (i) ACH - implement money movement to and from the Agencies in support of the settlement process.
- (j) Internet and/or other revalue methods identified by the Contractor - provide account setup, card initialization, revalue, balance inquiry, transaction history, and status inquiry transactions.

#### 5.2.4.2 System Interface and End Point Management

The Contractor shall maintain a database of all system interfaces and end points, and for each shall provide the following management functions:

- (a) Security:
  - i. Maintain valid user id and passwords.
  - ii. Validate all system logon and usage activity.
  - iii. Maintain encryption keys necessary for transmission and decryption of secured data.
  - iv. Maintain transaction privileges valid for each end point.
  - v. Develop recovery plan in the event of a security breach.
- (b) Transaction validation:
  - i. Assure all transactions originate from a recognized end point, using a recognized and valid card with privileges appropriate to perform that transaction type.
- (c) Transaction logging:
  - i. Provide a complete transaction history for each end point, suitable for ad hoc inquiry.
- (d) Interface protocols:
  - i. Maintain table of interface management information including interface frequencies, communications management (which partner initiates communications), date and times for expected batch transmissions, contact points, and communications protocols.
- (e) Software management:
  - i. Maintain “load images” of application data suitable for download to update the Contractor provided software in transaction devices and other interface points.
  - ii. Maintain complete download history and current release of software.
- (f) Transaction batch management:
  - i. Maintain information on last ‘n’ transaction batches received from each end point and provide processing algorithms to assure all available transactions are received on a twenty four hour cycle.
  - ii. Provide capabilities to detect duplicate or incorrect batches and provide error handling procedures.

**5.2.5 Fare Table Management (DR 5.05)**

The clearinghouse system will periodically receive fare table updates, pass revenue allocation formula updates and operational parameter updates as required for RFCS operation from participating Agencies.

- (a) The RFCS shall include capabilities to validate the incoming updates, store multiple releases of them, format them for distribution to all FTPs and revalue locations, and download them to those endpoints as needed.
- (b) The system shall include capabilities for Agency staff to test all fare tables prior to distribution to system endpoints. Fare table testing capabilities shall include at a minimum:
  - i. Data integrity checks.
  - ii. Local Agency testing of new fare tables to verify that fare transactions are correctly processed, and that revenue and data are correctly reported.
  - iii. Testing of new fare tables on a regional basis to verify that inter-system transactions are correctly processed, that other Agency fare tables are not adversely impacted, and that revenue and data are correctly reported.
- (c) The RFCS shall store a minimum of three fare tables and operational parameter updates for each Agency: Prior, current and those for the next fare or service change.
- (d) The RFCS shall include features to replace, as required, fare tables and operational parameters if a new device is installed or a device requires replacement information.
- (e) The Contractor shall provide a solution for the coordination and timing of the downloads so that fare and operational parameter updates are implemented uniformly system wide, according to the effective date of the updates. The description shall include methods to ensure successful delivery to all affected end points.

**5.2.6 Fraud Management (DR 5.07)**

- (a) The Contractor shall provide regular fraud management reports.
- (b) The Contractor shall develop procedures to detect and/or avoid any inappropriate or fraudulent use of the system. Possible solutions can include software products which look for anomalous transaction patterns such as:
  - i. Card groups or types consistently overdrawing available balances

- ii. Individual card accounts that are regularly overdrawn or have regular fare underpayments
- iii. Inconsistent card use patterns
- iv. Frequency and usage inconsistencies
- v. More than one card with same serial number

### **5.2.7 Reporting**

The Contractor shall be responsible for the creation of reports as defined in Section 6.III-13, Back Office Data Integration and Reporting.

### **5.2.8 Database Management (DR 5.08)**

- (a) The Contractor is responsible for support and maintenance of the databases necessary for access to RFCS information resources.
- (b) The RFCS shall manage data access requirements, and the integration and linking of data elements so as to provide a seamless management view of all data resources. The Contractor shall provide a solution for protecting access to Agency privileged information to that Agency's staff, and to personal information provided for card linking.
- (c) Logical collections of data to be managed by the Contractor shall include as a minimum:
  - i. End Point Database
  - ii. Transaction Batch Management Database
  - iii. Card Account Database
  - iv. Card Linking Database
  - v. Card Account Transaction History
  - vi. Transaction Acquirer History Database
  - vii. Security and Access Control Database
  - viii. Cash Management Database
  - ix. Financial Settlements Database
  - x. General Accounting Database
  - xi. Fare Table Database
  - xii. Operational Parameters Database
  - xiii. Reports Archive
  - xiv. Customer Service Tracking and Management Database
  - xv. Historical Database of Blocked and Inactive Cards

- (d) The Contractor shall provide services and facilities for the regular backup of all data, off site archiving, ad hoc report queries, and disaster recovery (CDRL 5).
- (e) Data shall be maintained for a minimum of ninety (90) days before archiving.
- (f) The Contractor shall provide services and systems for Agency access to archived data. Processes and procedures for access to archived data shall be described.

#### **5.2.9 Audit (DR 5.09)**

The Contractor shall provide for an annual independent audit of the RFC system to validate accuracy of all systems processing, cash management, and Agency settlement. Audit shall be conducted in accordance with generally accepted auditing standards by an independent auditing firm acceptable to the Agencies. Books, records, document, and other evidence directly pertinent to performance under this Contract shall:

- Be maintained for a minimum of six (6) years
- Kept in accordance with generally accepted accounting principles
- Made available upon request for examination

### **6.II-5.3 Performance Requirements**

- (a) The batch interface shall have a minimum 99% availability 24 hours a day, 7 days a week, per the availability formula contained in Section 6.III-1.5.2.
- (b) The on-line interface shall have a minimum 99% availability 24 hours a day, 7 days a week, per the availability formula contained in Section 6.III-1.5.2.
- (c) Revenue shall be reconciled and settled with 100% accuracy.
- (d) Financial settlement shall be the next business day after transactions are uploaded to the clearinghouse system.
- (e) Daily reports shall be available by 8 a.m. Pacific time the next business day.
- (f) Monthly reports shall be available by the sixth (6<sup>th</sup>) business day of the following month.
- (g) Data extracts for the Agencies shall be available the next business day.
- (h) At a minimum, data shall be uploaded and downloaded every 24 hours.
- (i) Card, application and function blocks, option changes, and revalue information shall be downloaded to the Data Acquisition System and Revalue Network within twelve (12) hours of recording by the clearinghouse system.

**6.II-6     MARKETING PLAN**

This Section has been deleted in its entirety. The Agencies will be responsible for marketing.

**6.II-7 FINANCIAL MANAGEMENT****6.II-7.1 Financial Management Description**

The Contractor shall provide services necessary for the financial management of revenues accrued through RFCS operations (DR 6) including:

- Management of funds transfers between Agency accounts.
- Management of funds transfers between third party revalue points and Agency accounts.
- Management of fees approved or implemented by the Agencies.
- Providing invoicing information in support of Institutional Program Management.

All financial management practices shall be per the direction of or shall be approved by the Agencies.

**6.II-7.2 Functional Requirements****7.2.1 Cash Management (DR 6.01)**

- (a) The Contractor shall be responsible for management and accounting for revenue from transactions.
- (b) The Contractor shall manage funds between Agency-designated accounts, and between third party accounts and Agency-designated accounts.
- (c) The Contractor shall provide cash management processes which:
  - i. Comply with settlement and cash management practices as directed by the Agencies.
  - ii. Minimize accounts receivable
- (d) Revenue transfers from third party accounts shall be deposited into designated Agency accounts.
- (e) The RFCS shall support the acceptance of payment in the following forms:
  - i. Credit card
  - ii. Debit card or direct bank debit
  - iii. Cash sales
  - iv. Checks sales

- v. Vouchers
- vi. ACH or direct deposit
- (f) The Contractor shall be responsible for the collection and management of cash receipts from unattended revalue devices, with the exception of Sound Transit TVMs.
- (g) The Contractor shall prepare a management plan which identifies risk and risk management strategies for non-sufficient funds (NSF) revalue transactions (CDRL 6) related to check handling and other payment forms.
- (h) The Contractor shall provide industry standard cash management procedures, including compliance with Washington State Office of the State Treasurer/Office of Financial Management (OST/OFM) standards for cash management, to ensure the accuracy and security of deposits and to maximize interest earned. The procedures shall be subject to Contract Administrator approval and authority, and contingent on laws, policies and regulations governing Agency operation.
- (i) All payments shall be on a cash basis, distributed at the time of funds receipt.
- (j) All payments shall be reconciled against supporting revalue transactions, regardless of whether payment occurs at the time of or subsequent to the revalue transaction.
- (k) The Contractor shall reconcile all cash in the system against receipts and settlements.
- (l) The Contractor shall provide standard accounting records and functions (accounts payable, accounts receivable, invoicing, general ledger, payments processing, accounts aging) for each end point including revalue network, institutional programs, and other sales locations.
- (m) The Contractor shall manage the cash position of the system in order to guarantee its successful on-going operation.
- (n) the Contractor shall implement procedures to ensure security and integrity of cash accounts and daily receipts, such as dual person control points, lock boxes, independent verification of deposits, and other common financial controls.



**7.2.2 Fee Management (DR 6.02)**

- (a) The Contractor shall, under the direction of and subject to approval by the Agencies, track, account for, collect or pay, audit, and settle fees associated with Contractor's RFCS servicing, including:
  - i. Credit card merchant fees
  - ii. Debit card interchange fees
  - iii. Retailer sales commissions
  - iv. ACH item fees
  - v. Banking fees (check handling, lockbox, NSF, etc.)
  - vi. Card fees and refunds (per Contract Administrator direction and agreement)
- (b) The Contractor shall provide general accounting processes to manage all fee receipt and payments and shall provide daily reconciliation of fees paid or collected as a part of cash entering and exiting the system.
- (c) The Contractor shall provide adequate management and control procedures related to all fee receipts and disbursements.

**7.2.3 Merchant of Record (DR 6.03)**

- (a) A designated Agency will act as merchant of record. The Contractor shall provide merchant of record services on behalf of that agency for credit card and debit card conducted by Contractor.
- (b) The Contractor shall be responsible for operation and management of all related merchant of record functions for transactions conducted by the Contractor including:
  - i. Charge backs
  - ii. Denials and reversals
  - iii. Cancellations and adjustments
  - iv. Audit and control
  - v. Transaction settlement and cash reconciliation
  - vi. Fees
  - vii. Dispute handling and resolution
  - viii. Fraud control

**7.2.4 Institutional Program Management (include in DR 2)**

- (a) The Contractor shall provide services for invoicing and collection of revenues per the terms of the individual institutional payment arrangements between one or more Agencies and the individual institution.
- (b) The Contractor shall provide standard accounting records and functions (accounts payable, accounts receivable, invoicing, general ledger, payments processing, accounts aging) for management of each of these programs.

**6.II-7.3 Performance Requirements**

- (a) The Contractor shall comply with Washington State Office of the State Treasurer/Office of Financial Management and local agency financial management requirements.
- (b) The Contractor shall mitigate risk on funds management.
- (c) The Contractor shall maintain receivables at less than forty-five (45) days from the receivable due date.
- (d) The Contractor shall reconcile revenue daily (7 days a week).

**6.II-8 NETWORK MANAGEMENT****6.II-8.1 Network Management Description**

The RFCS program inherently will require a distribution of functions to many locations which will be linked together through a telecommunications infrastructure. Information shall flow between the points of service, the revalue network, the data acquisition system and fare transaction processors, the clearinghouse system and the various Agencies back office systems.

The Agencies will provide local communications in the Central Puget Sound Region to all Agency facilities using Government data networks and/or local commercial communications service providers.

The Contractor shall provide communications to services and facilities outside the Central Puget Sound Region (e.g. remote clearinghouse, second-tier customer service center, repair facility, etc.), the retail communications network, and (if required) communications to institutions (DR 7).

**6.II-8.2 Functional Requirements****8.2.1 Agency-Supplied Networks**

- (a) The Agencies will provide local communications to transit bases, ferry and rail terminals, Agency headquarters, and other Agency locations in the Central Puget Sound Region to meet communications requirements specified by the Contractor. Communications will be provided between Agency facilities and:
  - i. Data Acquisition Computers (DACs)
  - ii. Stand-Alone/On-line Fare Transaction Processors (FTP's)
  - iii. Sound Transit CDCS
  - iv. Sound Transit TVMs
  - v. Customer Service Terminals
  - vi. Agency Back Office Systems
- (b) The Agencies will provide local communications links to credit card, debit card and ACH networks for endpoints where the Agencies are the merchant of record.
- (c) Local communications facilities shall consist of existing Government and/or commercial carrier networks.
- (d) The Contractor shall be responsible for fault detection and performance monitoring of Agency provided communications networks.

- (e) The Contractor shall identify network capacity, security and performance requirements required for RFCS operation.

### **8.2.2 Contractor Supplied Networks**

- (a) The Contractor shall provide communications to support all system interfaces not included in the Agency supplied network. At a minimum, the network shall provide for the interconnection of the following:
  - i. Local devices connected through the Agency supplied network.
  - ii. Clearinghouse system
  - iii. Contractor provided call and repair centers
  - iv. Debit, credit and ACH networks
  - v. Revalue network
  - vi. Institutional Programs (if required)
  - vii. Internet
- (b) The Contractor shall provide a network configuration that shall provide adequate availability and capacity to meet the demands of each individual interface and end point. Such communications may include on-demand (dial) services, radio frequency, leased line, frame relay, packet switched, Internet access, satellite, or any other transport mode according to the Contractor's selected solution.
- (c) The provision and management of network components will be subject to individual Agency maintenance practices.
- (d) The network shall include backup communications in the event of a failure of the primary link.

### **8.2.3 Network Management (DR 7.01)**

- (a) The Contractor shall provide network management services necessary to monitor and support the network infrastructure (both Agency and Contractor supplied) to ensure continued high availability and transaction throughput.
- (b) Monitoring and management of each Agency's network shall be per Agency policy and systems.
- (c) In the event that Agency firewalls or other protections prevent direct monitoring of devices connected to the Agency network, the network management system shall accept fault detection or alarms by Agency monitoring systems.

- (d) The Contractor shall notify the Agencies or their designates in the event of fault detection or failure of the Agency supplied network to meet performance requirements.
- (e) The Contractor shall provide a network backup and disaster recovery plan, procedures and systems (CDRL 5).

#### **8.2.4 Data and Operations Management (DR 7.02)**

- (a) The Contractor shall provide services and systems for:
  - i. The regular backup of all data
  - ii. Off-site archiving
  - iii. Reporting
  - iv. Data recovery
- (b) The Contractor shall identify in Design Review documentation (DR 7.02):
  - i. Points of risk, failure or uncertainty in the communications network.
  - ii. Procedures for maintaining the integrity of all data.
  - iii. Bandwidth, availability and other requirements for the Agency supplied communications network to meet the performance requirements of 6.II-8.3.

#### **6.II-8.3 Performance Requirements**

- (a) The communications network shall have a minimum 99% availability 24 hours a day, 7 days a week, per the availability formula contained in Section 6.III-1.5.2.
- (b) On-line transaction response times shall be less than two (2) seconds from the request being sent to the end point plus time required for credit and debit card authorization (if applicable).
- (c) Network capacity shall be provided so that all daily upload and download activity is completed within one (1) hour.

**6.II-9 REVALUE NETWORK SUPPORT SERVICES**

RFCS Contractor shall provide equipment and support services for a geographically comprehensive retail revalue network as part of this Contract (DR 8). This is in supplemental to the core fare card revaluing subsystems and options described elsewhere in this RFP.

The supplemental revalue network is expected to include between 100 and 200 retail locations throughout the region. It shall be the Contractor's responsibility to provide equipment for and maintain the supplemental revalue network.

**6.II-9.1 General Requirements**

- (a) The Contractor shall be responsible for providing all required hardware, software, communications, maintenance and technical support for the revalue network (DR 8.01).
- (b) The Agencies shall maintain and manage contractual agreements with retail outlets, and shall be responsible for the establishment of the commission structure.
- (c) The Contractor shall provide hardware, software, communications and support, and shall be responsible for equipment installation and maintenance at Agency designated retail outlets.
- (d) The revalue network may be some combination of attended and unattended devices or locations.
- (e) Contractor shall cooperate with and assist the Agencies in establishing additional revalue services, and shall be reimbursed for such services under separate agreement. This may include special arrangements for institutional programs.
- (f) All devices and/or locations should be identified by the RFCS logo and program name.

**6.II-9.2 Functional Requirements**

The revalue network and support services shall meet the following functional requirements:

- (a) The revalue network as a whole shall cover all types of RFCS revalue functions and fare categories, including passes and stored value.
- (b) The revalue network shall permit customers to pay with multiple forms of payment. Not all devices are required to support all types of payment, but the revalue network as a whole shall support payment by cash, credit, debit, electronic purse, and employer program electronic coupon.

- (c) Some or all of the revalue network shall permit customers to check the remaining balance on their cards and to view transaction history up to the last 10 transactions.
- (d) The revalue network system and data shall be auditable by independent auditors should the Contractor and/or the Agencies deem an audit necessary.
- (e) The Contractor shall train Agency staff in the operation of retail outlet revalue devices. Agency staff will be responsible for training retail outlet staff.

### 6.II-9.3 Performance Requirements

The Contractor shall provide equipment, installation and support for a revalue network throughout the Region where consumers can load value onto RFCS cards. Such a network shall be dispersed geographically consistent with the Agencies overall distribution strategy and retail outlet locations.

- (a) The Contractor shall provide details of revalue network support services in their Revalue Network and Support Services Plan (CDRL 7).
- (b) The Revalue Network and Support Services Plan shall include quantified performance standards and measurement methodology, and shall be developed in cooperation with the Contract Administrator and designated Agency customer service staff.
- (c) Minimum performance standards shall include:
  - i. Repair or replacement of revalue network devices within two (2) working days of fault notification or detection.
  - ii. Ability to operate in an off-line mode.
  - iii. For dial-up connections, no more than three retries before a successful connection.
- (d) The revalue network shall provide revalue options for, and be designed for ease of use by, various transit customer groups and markets. Criteria to be considered include:
  - i. Providing access and payment options for banked and unbanked customers alike
  - ii. ADA requirements accommodation
  - iii. Using new technologies to increase revalue options
  - iv. Designing devices for ease of use using modern industrial design practices, and providing clear instructions for use
  - v. Providing maximum availability over a 24 hour period
  - vi. Being cost effective for Agencies, retail outlets and customers

**6.II-10 MAINTENANCE AND TECHNICAL SUPPORT SERVICES****6.II-10.1 Maintenance and Technical Support Services**

- (a) The Contractor shall provide maintenance services as described in Section 3.I-58, RFC System Warranty and Post-Warranty Maintenance, including:
  - i. Depot Maintenance
  - ii. On-Site Maintenance
  - iii. Software Maintenance
- (b) Contractor and Agency responsibilities shall be described in a Maintenance Plan (CDRL 8).
- (c) The Contractor shall provide monthly Maintenance Reports including:
  - i. System Wide Spares Inventory Report (CDRL 9)
  - ii. Fault Tracking and Maintenance Performance Reports (CDRL 10)
- (d) The Contractor shall provide Agency Technical Support Services as described in 6.II-10.2.

**6.II-10.2 Agency Technical Support Services****10.2.1 Technical Support Services**

Contractor shall provide technical support over the phone to Agencies.

- (a) Technical support shall cover all RFCS software, hardware, and systems and operational processes necessary for Agency operation of the system.
- (b) All technical support personnel shall be fully qualified to perform such support functions; the Contract Administrator reserves the right to request replacement of personnel deemed unqualified or whose performance deemed unsatisfactory for any reason.
- (c) The Contractor shall maintain an on-line knowledge base of maintenance events, problems and resolution.



**10.2.2 Agency Phone Support Service Levels**

Phone support shall be provided by “live” personnel, or some combination of “live” personnel and automated response.

- (a) Maintenance and Agency phone service support levels shall be subject to Contract Administrator approval and shall include the following minimum requirements:

(i) Hours of operations:	24 hours per day, 7 days per week
(ii) Calls connected within:	4 rings
(iii) Time in phone queue:	90% of calls within 20 seconds of connection 100% of calls within 2 minutes of connection
(iv) Abandoned call rate:	Less than 4%

- (b) Contractor shall develop service procedures and service personnel requirements (CDRL 11).
- (c) Contractor shall maintain detailed statistics of support service efficiency and operation and provide a methodology for measuring performance (CDRL 11). A Support Service Statistics report shall be provided to the Contract Administrator monthly (included in CDRL 12).

Performance measurement methodology is subject to Contract Administrator review and approval.

## 6.II-11 SYSTEM IMPLEMENTATION

The implementation of the RFCS will occur in two Phases. Phase I will culminate with Beta Test Acceptance, and Phase II will culminate with Full System Acceptance. In addition, the Agencies will use the definitions for Project Schedule Acceptance, Final Design Review Acceptance, Beta Test Readiness Acceptance, Beta Test Acceptance, and Full System Acceptance when determining completion for payment purposes. Definitions of these are as follows:

- (a) **Phase I:** Design and Implementation through Beta Testing. The purpose of Phase I is to design the entire RFC system and then test (end-to-end) full system functionality of all components of all systems in revenue service with a limited number of cardholders and limited equipment. Beta Testing is further described in Section 11.4.6.
- (b) **Project Schedule Acceptance:** Project Schedule Acceptance will occur upon approval by the Contract Administrator of the Baseline Project Schedule.
- (c) **Final Design Review Acceptance:** Final Design Review Acceptance will occur upon approval by the Contract Administrator of the Final Design Review (Sections 6.II-11.2.2.3 and 6.II-11.2.3).
- (d) **Beta Test Readiness Acceptance:** Beta Test Readiness Acceptance will occur upon approval by the Contract Administrator of the Certification of Beta Test Readiness (Section 6.II-11.4.6.6).
- (e) **Beta Test Acceptance:** Beta Test Acceptance will occur upon approval of the following items by the Contract Administrator:
  - i. Completion of all design, development, installation, integration, test, and documentation requirements for Phase I
  - ii. Completion of all Engineering and Design requirements for Phase I described in Section 11.2
  - iii. Completion of all Installation requirements for Phase I described in Section 11.3
  - iv. Completion of all Testing requirements for Phase I described in Section 11.4
  - v. Completion of all items for Phase I on the Contract Document Requirements List (CDRL) in Section 11.6
  - vi. Completion of all Training requirements for Phase I described in Section 12
- (f) **Phase II:** Full RFCS Rollout. The Contractor shall proceed with Phase II upon Beta Test Acceptance *and* approval from the Contract Administrator. Phase II shall include the following activities:

- i. Design and test of any system modifications as a result of the Beta Test
- ii. Installation of all RFCS equipment region wide
- iii. Distribution of RFCS cards region wide
- iv. Expanding services until required levels have been achieved and maintained for a specified period of time

(g) **Full System Acceptance:** Full System Acceptance of the RFCS will occur upon approval of the following items by the Contract Administrator:

- i. Completion of all design, development, installation, integration, test, and documentation requirements for Phase II
- ii. Completion of all Engineering and Design requirements for Phase II described in Section 11.2
- iii. Completion acceptance of all Installation requirements for Phase II described in Section 11.3
- iv. Completion of all Testing requirements for Phase II described in Section 11.4
- v. Completion of all items for Phase II on the Contract Document Requirements List (CDRL) in Section 11.6
- vi. Completion of all Training requirements for Phase II described in Section 12
- vii. Completion of all outstanding work and deliverables

The Contractor shall be fully responsible for implementation of the system. This section defines the requirements for the implementation of the RFC system, as follows:

- (a) Implementation planning criteria
- (b) System engineering and design requirements
- (c) System/equipment installation requirements
- (d) System/equipment testing requirements
- (e) Progress and performance monitoring process

### 6.II-11.1 Implementation Planning Criteria

This section identifies the requirements for the development of the implementation approach for the RFCS. The following items are presented:

- (a) Regional implementation criteria
- (b) Agency specific criteria

- (c) Regional preference
- (d) A schedule of implementation milestones
- (e) Requirements for the development of an Implementation Plan
- (f) Requirements to conduct special demonstration programs

#### **11.1.1 Regional Implementation Criteria**

The Contractor shall design the RFCS rollout strategy to meet the following objectives and criteria:

- (a) The RFCS shall be based on the introduction of a contactless-only card to support the RFCS application. All devices in the system that communicate with the card (including retail revalue devices) shall do so via the contactless interface.
- (b) Provide immediate customer value
- (c) Minimize revenue exposure
- (d) Minimize negative publicity in the event of system or equipment failure
- (e) Minimize operational disruptions
- (f) Minimize implementation cost
- (g) Maximize efficiency and speed of implementation
- (h) Maximize coordination of services offered by interfacing Agencies
- (i) Complete Phase II - Full RFCS Rollout. Date to be determined.
- (j) Complete Agency training necessary to operate, support, and maintain the Phase I and Phase II system prior to the RFC system going live in Phase I and Phase II, respectively.

The implementation strategy for the Phase I and Phase II rollout shall be developed in concert with the Contract Administrator and these criteria and documented in the Implementation Plan (CDRL 13) described in Section 11.1.5.

### 11.1.2 Agency Specific Implementation Criteria

The implementation of RFCS at each of the participating Agency sites will vary based on the operating environment for each Agency (i.e. Bus, Rail and Ferry), the fare structures supported by each Agency (i.e. flat fare, distance based/zone based fare, route based fare), and the regional fare policy developed. Detailed implementation requirements for each Agency's systems required and quantities, fare structures to be supported and fare tables, infrastructure profile and installation requirements will be provided during system design. Estimated equipment quantities are documented in Appendix A, "Estimated Agency Equipment Quantities". Equipment quantities will be finalized at the time of order.

The Contractor shall work directly with each Agency to further define requirements for Beta Test and Full Rollout, including equipment installation, and card introduction/distribution. In cooperation with each Agency, the Contractor shall develop detailed rollout requirements for each Agency as follows:

- (a) The Contractor shall visit the facilities of each Agency to develop a complete understanding for the specific implementation requirements at each Agency.
- (b) The Contractor shall work with individual Agencies to finalize the details of their implementation. This shall include reaching final agreement on the seating of all equipment to be installed at that Agency's facilities or on their vehicles.
- (c) Such agreement shall be formally approved by each Agency and by the Contract Administrator.

A list of estimated Beta test equipment quantities is contained in Appendix A.

#### 11.1.2.1 Community Transit

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment, unless otherwise indicated) at Community Transit (CT):

- (a) The Beta Test shall consist of equipment installed at only one base, Merrill Creek Base, and must include CT's CSO to test the integration of the CT point of sale terminal with the new system.
- (b) Equipment rollout shall occur by base.
- (c) On-site installation of equipment shall occur only on weekends (Saturdays and Sundays) at times to be coordinated with CT.

- (d) All equipment installation shall be coordinated with CT personnel to permit CT personnel to observe/assist with installation activities.
- (e) System start-up shall not occur on the day of a seasonal service schedule change (mid February and mid September).

#### 11.1.2.2 Everett Transit

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment, unless otherwise indicated) at Everett Transit:

- (a) Installation of all equipment shall take place at Everett Station.
- (b) System implementation shall be coordinated with that of Community Transit implementation at Mukilteo.
- (c) No system start-up shall occur on the day of a seasonal service schedule change.

#### 11.1.2.3 King County Metro

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment, unless otherwise indicated) at King County Metro:

- (a) The Beta Test shall consist of equipment installed at only one base, to be specified by the Contract Administrator, and must include at least one CSO to test the integration of the KCM point of sale terminal with the new system.
- (b) On-site installation of equipment shall occur during the days and times as directed by KCM, and may occur on weekdays and/or weekends (Saturdays and Sundays).
- (c) No system start-up shall occur on the day of a seasonal service schedule change which usually occurs on the first Saturday in February, last Saturday in May, and the third Saturday in September.
- (d) King County Metro will replace their existing mobile data terminal (MDT) with the driver display unit (DDU) and radio control unit (RCU) supplied under this contract.
- (e) The driver display unit and radio control unit must be operational once the on-board equipment is installed.

- (f) Implementation of the RFCS in King County shall be coordinated with the work of other contractors and the implementation of other on-board systems. Two devices, the Driver Display Unit (DDU - Section 6.III-6) and Radio Control Unit (RCU - Section 6.8.3) are integral to King County's on-board systems projects. Within 16 months of Notice to Proceed, these and other related devices shall be delivered as described below.
  - i. Pre-production prototype DDUs shall be delivered to King County in quantities required for development. These will be used by King County and designated contractors to develop other on-board system devices and applications.
  - ii. The prototype DDU shall have the production hardware, operating system, user interfaces, and data interfaces, as well as the core application software required to operate the device, program and operate the keys and display, and create, send and receive messages to other devices. Full functionality of RFCS-specific application software is not required.
  - iii. DDU software and documentation shall be provided such that application and interface development can proceed on the DDU and other on-board devices (by King County or designated contractors).
  - iv. Pre-production prototype RCUs shall be delivered to King County in quantities required for development. These RCUs shall have the production hardware, operating system, and data interfaces required to operate the devices. Final documentation shall be delivered.
  - v. Final production Wireless Data On-Off Load Systems (WDOLS - Section 6.III-7) and pre-production Data Collection Systems (DACS - Section 6.III-12) shall be delivered to King County in quantities required for development. These will be used to develop and test data transfer from the vehicle to the DACS. Both devices shall be supplied with the hardware, software and documentation required to conduct this development. Full functionality of RFCS-specific application software is not required.
- (g) Within 18 months of Notice to Proceed, final production DDUs and RCUs shall be delivered in quantities to support the RFCS Beta test, as well as a separate KCM on-board systems beta test (by others). Estimated quantities for both tests are included in Appendix A.

#### 11.1.2.4 Pierce Transit

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment, unless otherwise indicated) at Pierce Transit:

- (a) The Beta Test shall consist of equipment installed at only one base, to be specified by the Contract Administrator, and must include at least one CST.
- (b) Equipment rollout shall occur by base.
- (c) Installation of equipment depends on staging process selected.
- (d) No system start-up shall occur on the day of tri-annual service change (dates to be provided by PT).

#### 11.1.2.5 Sound Transit

##### 11.1.2.5.1 Background

Sound Transit will operate bus (Regional Express), commuter rail (Sounder) and light rail (Link) services. Fareboxes for Regional Express buses have been procured through a separate contract. Sound Transit has also installed Scheidt & Bachmann ticket vending machines, ticket office machines, and a central data collection system for Sounder. Fare collection equipment for Link light rail has not yet been selected.

##### 11.1.2.5.2 Criteria

The installation of all equipment shall be coordinated with Sound Transit.

- (a) The RFCS contractor shall coordinate with Sound Transit's rail fare collection system provider for the implementation of RFCS functionality at rail facilities as defined in Section 6.III-13.2.2.7.
- (b) Sound Transit buses are assigned to facilities owned by existing transit Agencies. Therefore, the installation and start-up of on board equipment for Sound Transit buses shall be coordinated with the RFCS implementation at the Agency bases to which the corresponding vehicles are assigned.
- (c) Beta Test on Sound Transit shall include Sounder Service between Tacoma and Seattle, and Regional Express Tacoma-Seattle service.
- (d) Beta Test shall include TVM modifications and customer service facilities at the Tacoma Dome and King Street.



- (e) Beta Test may include Pierce Transit services at the Tacoma Dome.
- (f) Installation procedures and schedule for supplying and installing equipment on Sound Transit coaches operated by King County Metro shall be per Section 6.II-11.1.2.3.

#### 11.1.2.6 Kitsap Transit

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment, unless otherwise indicated) at Kitsap Transit:

- (a) The Beta Test shall operate on Kitsap Transit commuter bus service, and shall include one Customer Service Terminal.
- (b) System implementation shall be coordinated with Washington State Ferries.
- (c) No on-board equipment installation shall take place during commute hours.

#### 11.1.2.7 Washington State Ferries

The following requirements shall apply to implementation of the RFCS (including Beta Test equipment) at Washington State Ferries:

- (a) The Beta Test shall consist of equipment installed at one terminal and possibly two routes out of that terminal (to be specified by WSF at Conceptual Design Review).
- (b) The Beta Test may include one CST for WSF.
- (c) Equipment rollout shall occur by terminal, by route.
- (d) On-site installation of equipment shall occur during the days and times as directed by Washington State Ferries.
- (e) No system start-up shall occur on the day of a seasonal fare or schedule change. These occur three times a year.
- (f) The interface between the RFCS and Washington State Ferries new Revenue Collection System shall be included in the Beta Test.

**11.1.3 Regional Preference**

The preferred regional implementation strategy for Phase II rollout is to install all equipment system-wide following completion and acceptance of the Beta Test. Within the installation process, all on board vehicle equipment and data acquisition computers would be installed by operating base.

On completion of system wide installation, the system rollout would occur by customer type i.e. agency personnel, institutional accounts, campus and finally general public. Card distribution will occur in a controlled and managed process where cards will be released based on the confidence in and reliability of the system. All cards will be fully functional when released for use. The future implementation plan must address future card use on services that are not yet operational (i.e. Sound Transit Link).

**11.1.4 Implementation Milestone Schedule**

The Contractor shall use the milestones listed in Figures II-11.1 and II-11.2 as the basis for developing the project schedule.

**Figure II-11.1  
System Design, Engineering and Testing Milestones**

<b>MILESTONE</b>	<b>COMPLETION CRITERIA</b>
<b>Phase I Notice to Proceed</b>	
<b>Phase I Design, Engineering and Testing</b>	
Submit Project Schedule and Quality Assurance and Control Plan	
Project Schedule Acceptance	All items defined in Section 6.II-11 (b)
Complete Conceptual Design Review	All items defined in Section 11.2.2.1
Complete Preliminary Design Review	All items defined in Section 11.2.2.2
Complete Final Design Review and Establish Design Baseline	All items defined in Section 11.2.2.3 and 11.2.3
Final Design Review Acceptance	All items defined in Section 6.II-11 (c)
Complete Factory Acceptance Testing	FAT elements defined in Section 11.4.2 for each type of equipment
Complete System Integration Testing	All items defined in Section 11.4.3
Deliver Beta Test Systems and Equipment, O&M, Software, and Training Manuals and software documentation	All items defined on Price Schedule
Complete Installation Inspection of Equipment to be Beta Tested	All items defined in Section 11.3.2
Beta Test Readiness Acceptance	All items defined in Section 6.II-11 (d)
Complete Installation Testing and System Commissioning	All items defined in Section 11.4.4 and 11.4.5
Complete Agency Training	All applicable training as defined in Section 12.2
Begin Beta Test	n/a
Complete Beta Test (Functional Acceptance)	All items presented in Section 11.4.6.
Beta Test Acceptance	All items defined in Section 6.II-11 (e)
<b>Phase I Complete</b>	

**Figure II-11.2  
Full Rollout Milestones**

<b>MILESTONE</b>	<b>COMPLETION CRITERIA</b>
<b>Phase II Notice to Proceed</b>	
<b>Phase II Design and Testing</b>	
Complete Final Design Review	Revised QA/QC Plan and revised/updated versions of all items described in Section 11.2.2.3
Complete Factory Acceptance Testing for Modified Systems and Equipment	FAT elements defined in Section 11.4.1
Complete System Integration Testing for Modified Systems and Equipment	All items defined in Section 11.4.3
<b>Phase II Installation and Testing</b>	
Deliver and Install Full Rollout equipment and software	All items listed on Price Schedule
Deliver Full Rollout Configuration O&M, Software, and Training Manuals and software documentation	All documents listed in Figure II-11.4
Complete Installation Testing	All items defined in Section 11.4.3
Complete System Commissioning	All items defined in Section 11.4.4
Complete Operator Training	All applicable training as defined in Section 12.2
Begin Settling-In Period	All items presented in Section 11.4.7.1.
Complete Acceptance Testing of RFCS Systems and Equipment	Upon successful completion Acceptance Testing according Section 11.4.7
Full System Acceptance	All items defined in Section 6.II-11(g)
Begin RFCS Operations and Management Contract	System Acceptance
Begin RFCS Warranty Period	System Acceptance

### 11.1.5 Implementation Plan

The objective of the Implementation Plan is to provide criteria for design review, development testing and rolling out RFCS.

- (a) The Contractor shall develop, for Contract Administrator review and approval, the Implementation Plan (CDRL 13) defining criteria which must be undertaken for the full rollout of the RFCS, how these actions will be implemented, and the schedule for completion.
- (b) The Implementation Plan shall identify schedule drivers and assign responsibility for key components of the system.
- (c) Key components shall include functional, operational, and technical requirements, schedule coordination and systems integration criteria.
- (d) The Implementation Plan shall separately identify and define, at a minimum, the following criteria for the Beta Test and Full Rollout.
  - i. Agencies and facilities/locations designated for each stage of the implementation program.
  - ii. System architecture requirements including required functionality, methods of data transfer, audit and record-keeping requirements for each Agency, and establishment and operation of the Clearinghouse.
  - iii. Equipment requirements for each Agency including hardware, software, and network needs. Equipment requirements shall be summarized by implementation stage, Agency and location when applicable.
  - iv. Schedule for equipment design, development and prototype, testing, production, and installation tasks. Critical paths and dependencies shall be identified for each stage.
  - v. Roles and responsibilities of the participating Agencies, outside vendors, retail distributors and other parties involved in the program.
- (e) The Implementation Plan shall incorporate, and be consistent with, the plans governing specific sets of activities or project activities such as design, testing, installation, and operations.
- (f) The Implementation Plan shall be based on concurrent installation work occurring across all Agencies. Installation work shall be per Section 6.II-11.3.1.

- (g) The Implementation Plan is subject to the review and approval of the Contract Administrator. This Implementation Plan shall constitute the formal schedule commitments of the Contractor and shall be used to monitor and control the project.

#### 11.1.5.1 Revisions

- (a) The Plan shall be revised to reflect planned or unplanned events throughout the implementation process.
- (b) Two planned events that shall require formal revisions of the Plan are:
  - i. Finalization of the RFCS design, to reflect the impacts of any changes in the system from the original proposal.
  - ii. Evaluation of the Beta Test, to reflect the impacts of any decisions taken as a result of the Beta Test experience.
- (c) The Implementation Plan shall be updated every month throughout the system rollout, or whenever there are major changes during the implementation process.
- (d) All revisions to the Implementation Plan are subject to approval by the Contract Administrator.

#### 11.1.6 Special Programs

The Contractor shall provide equipment and services for Special Programs as described below.

##### 11.1.6.1 Vanpool Demonstration

The Vanpool Demonstration shall consist of the following:

1. Equipping a minimum of 10 vanpools with Portable FTPs. These shall not include vanpools that use WSF services. A decision to proceed with the vanpool demonstration and final schedule will be determined at PDR (CDRL 2).
2. Providing back office reporting and integration to allow customers with RFCS cards to use vanpools that are not equipped with PFTP. This functionality shall be implemented as part of Phase I.

##### **Vanpools Equipped with PFTPs:**

- (a) PFTPs shall meet the requirements for a full-function PFTP as described in Section 6.III-8.

- (b) The PFTP shall be provided with a communications interface to be determined by the Contract Administrator at Preliminary Design Review (CDRL 2).
- (c) The Contractor shall develop a demonstration plan that identifies strategies for minimizing or eliminating paperwork for collecting daily ridership data, reporting and managing vanpool revenue.
- (d) The Vanpool Demonstration shall test as a minimum:
  - i. The use of all pass and stored value fare payment methods accepted on fixed route services for vanpool fare payment.
  - ii. Fare payment for both regular and infrequent riders.
  - iii. Transfers between vans.
  - iv. Transfers between vans and fixed route transit services.
  - v. The allocation of subsidies for vanpool services and use, including subsidized passes and the Electronic Voucher Program.
  - vi. Methods for easily downloading transaction data and uploading new tables and parameters to the PFTP.
- (e) The Contractor shall provide vanpool utilization reports that shall include as a minimum van identification (numbers provided by the Agencies), driver identification, fare and transaction details, transfers between vans, and transfers between vans and other transit services.
- (f) The Demonstration shall identify or present the conceptual design for the proposed work process and information flow for vanpool providers to receive and transmit information to the Clearinghouse System.

#### **Use of RFCS Card on Vanpools Not Equipped with PFTPs**

- (a) Back office data reporting and integration shall be used to allow customers with an RFCS card to use vanpools that have not been equipped with PFTPs.
- (b) A customer shall have the option of linking their fare card to a specific vanpool using the vanpool ID at Agency customer service offices, or by telephone, mail or Internet.
- (c) The Internet Website shall include capabilities to generate monthly, weekly or ad-hoc reports of all RFCS cards linked to the vanpool, summarizing by card the fare products loaded and status (value, period pass validity, etc.).

- (d) Reports shall be available to the vanpool driver or Agency vanpool administrator. Different access privileges (to be defined at Preliminary Design Review) shall be established for the driver and vanpool administrator.
- (e) Reports shall also include vanpool subsidy information.

#### 11.1.6.2 Paratransit

A Paratransit application shall be provided for King County Metro that supports two modes of operation.

1. Equipping paratransit Vehicles with PFTP's to read RFCS fare cards. A decision to proceed with paratransit application and final schedule will be determined at PDR (CDRL 2).
2. Providing back-office integration to allow customers with an RFCS card to use Paratransit vehicles that are not equipped with PFTP's. This functionality shall be implemented as part of Phase I.

Fare options for Paratransit customers shall include the KCM ACCESS pass.

#### **Paratransit Vehicles Equipped with PFTP's**

- (a) Paratransit vehicles shall be equipped with full function PFTP's as described in Section 6.III-8.
- (b) The PFTP's shall be equipped with IEEE 802.11b communications as described in 6.III-8.5(b).iii, and a vehicle charger as described in 6.III-8.4.3.
- (c) Paratransit bases shall be equipped with WDOLS base equipment as described in Section 6.III-7, and DACs equipment as described in Section 6.III-12.

#### **Back-Office Integration**

- (a) A customer with an RFCS card loaded with an ACCESS pass shall be able to use both vehicles equipped with PFTP's, and vehicles without.
- (b) Back office integration shall be used to provide ACCESS dispatch services with information on customer eligibility as follows:
  - i. The fare card shall include an ACCESS pass category and client ID number provide by KCM.
  - ii. Fare cards configured as ACCESS passes shall only be issued at or through a King County customer service office.



Clients will provide eligibility information to the King County customer service representative when procuring the pass.

- (c) The RFCS, through the Back Office Client computer, shall provide, on a daily basis, a list of active ACCESS passes and client ID numbers in ASCII flat file format. This file will be imported into King County's Trapeze system for linking to the daily manifest.
- (d) The clients ACCESS pass status will be printed on the daily drivers manifest to provide verification of eligibility without requiring the client to present a card to an FTP.

## **6.II-11.2 Engineering and Design**

The Contractor's program for RFC system engineering shall consist of the following activities:

- (a) Industrial and Human Factors Design
- (b) System Design and Design Reviews

### **11.2.1 Industrial and Human Factors Design**

Industrial design principles shall be employed throughout the equipment design and manufacturing processes.

- (a) Industrial design aspects of the FTP configurations, Driver Display Unit and Revaluing Devices, shall be reviewed during the scheduled design review meetings.
- (b) Design calculations, layouts, and other documentation summarizing the human factors engineering considerations shall be submitted during the design reviews( to be included in a section of the DR documents for each device).
- (c) Topical reviews to address key issues shall be held as needed.
- (d) Documentation shall include the following:
  - i. Description of the assumptions concerning human capabilities and limitations.
  - ii. Results of any simulation programs employed to determine the human factors design requirements.

### 11.2.2 System Design and Design Reviews

- (a) Design reviews shall be conducted to evaluate the progress and technical, functional and programmatic adequacy of the RFCS design in accordance with the performance requirements of the Contract during design and engineering.
- (b) Prior to each review, a design review package shall be submitted that includes all Design Review (DR) items listed in Figure II-11.3.
- (c) Design review packages shall be provided at least 30 days before a design review meeting. The Contractor shall conduct the following three formal design reviews.

#### 11.2.2.1 Conceptual Design Review (CDR)

The objectives of the CDR (CDRL 1) is to familiarize the Agencies with the Contractor's intended design and procurement activities, resolve external interfaces, and provide the basis for proceeding to PDR.

- (a) The CDR shall cover the following:
  - i. Schedule compliance review and discussion of variances or delays.
  - ii. Confirm the Contractor's management team and the scope for each subcontractor.
  - iii. Provide a functional block diagram of the system and equipment.
  - iv. Provide a top level data model illustrating the major functional entities and relationships.
  - v. Provide outlines of all Design Review (DR) items indicated in Figure II-11.3.
  - vi. Provide narrative descriptions of the major subsystems proposed by the Contractor, including identification of components supplied by subcontractors for each equipment type.
  - vii. Identify all interfaces between the major subsystems, provide a schedule, and identify responsibilities for completion of detailed definition of the interfaces.
  - viii. Confirm that the Contractor is familiar with the intended operations and maintenance environment.
  - ix. Provide outline and format of customer interface messages.
  - x. Provide physical dimensions of each equipment type.

- xii. Identify power and other facility requirements for each equipment type.
  - xiii. Identify information needs and decisions required from the Agencies.
  - xiv. Provide description of problem tracking, resolution and reporting process.
  - xv. Description of all required Clearinghouse services.
- (b) Seven (7) copies of the submittals shall be provided prior to CDR in paper and electronic format. Each drawing submittal shall include one reproducible on Mylar, sepia, or equivalent.

#### 11.2.2.2 Preliminary Design Review (PDR)

The objective of the PDR (CDRL 2) is to review the progress of the project and evaluate specification compliance of the completed work and/or work in progress.

- (a) The PDR shall represent approximately 50% completion of the total engineering and organizational design. The PDR shall cover the following:
- i. Schedule compliance review and discussion of variances or delays.
  - ii. Provide draft documentation for all DR items indicated in Figure II-11.3.
  - iii. Revisions of drawings and documentation submitted for the CDR.
  - iv. Complete customer and user interface information and drawings, flow charts, server graphics, messages and menus, including accommodations of all operating boundary and error conditions. Customer and user interface information shall include as a minimum: user interface description, field level definitions, function key (or other control) definitions and processing logic, implemented business rules and/or special processing logic, CRUD (create, read, update, delete) functions, and access and/or security restrictions.
  - v. Detailed technical descriptions of all RFCS equipment.
  - vi. Detailed interface descriptions, including mounting arrangements and installation methods.
  - vii. Sample cards (disposable and revalue) including all logos and designs.

- viii. Single-line power diagrams and functional block diagrams for each device, including a functional overview and a description of how each device or subcomponent goes out of service.
  - ix. Systems architecture physical and logical diagrams that map the RFCS to the National ITS Architecture Standards.
  - x. Detailed data model describing entities, attributes, data dictionary and meta data.
  - xi. Communications interfaces.
  - xii. List of all data file formats.
  - xiii. List of special tools and software requirements.
  - xiv. Description of operational and physical compatibility with the existing equipment and equipment installations.
  - xv. Detailed human factors engineering results.
  - xvi. Design of access control for the equipment and the software menus.
  - xvii. Software system-level flow-charts.
  - xviii. Software data backup and recovery procedures.
  - xix. Software design descriptions (top level of software documentation) for microprocessor-based or programmable equipment.
  - xx. Clearinghouse processes.
  - xxi. Software version and configuration control system.
  - xxii. On-board equipment mock-ups.
  - xxiii. Design of all required Clearinghouse services.
  - xxiv. Draft reports and formats including as a minimum: report description, reporting data set, all user parameters indicating required or optional, each field definition including data source and any calculations, special formatting requirements, access or security restrictions.
- (b) The PDR shall be conducted at a location approved by the Contract Administrator.
- (c) Seven (7) copies of the specific submittals shall be provided prior to PDR in paper and electronic format. Each drawing submittal shall include one reproducible on Mylar, sepia, or equivalent.

### 11.2.2.3 Final Design Review (FDR)

The objective of the FDR (CDRL 3) is to determine whether the detailed design satisfies the design requirements established in the Contract documents.

- (a) The FDR shall be conducted when detailed design is complete.
- (b) All DR documents listed in Figure II-11.3 shall be prepared in final form.
- (c) The FDR shall cover the following:
  - i. Schedule compliance review and discussion of variances or delays.
  - ii. Provide all FDR Items indicated in Figure II-11.3.
  - iii. Latest revisions of the drawings and documentation submitted for the PDR.
  - iv. Shut-down and start-up sequences.
  - v. Demonstrate compatibility with existing Agency equipment.
  - vi. Assembly drawings down to the lowest replacement unit level.
  - vii. Electrical schematic drawings, down to the individual signal or wire level, for each electrical circuit.
  - viii. Flow charts or structure charts that give an overview of the processor software.
  - ix. Software documentation at the second level, consisting of the data model (entities, attributes, data dictionary and meta data) to the lowest level of decomposition with software module descriptions (or elemental process descriptions) in structured narrative format. The second level of software documentation is one level above source code and should include descriptions for each equipment type.
  - x. Input data definitions.
  - xi. Output data definitions.
  - xii. Interrupt structure definition.
  - xiii. Program parameters.
  - xiv. Diagnostic routines for processor self-test and subsystem self-test.
  - xv. Error handling routines.
  - xvi. Data dictionary.

- (d) The Contract Administrator shall have on-site access to drawings and other design and manufacturing information related to manufacturing release of devices, including microprocessor source code and other proprietary technical data, but only to the extent the Contractor in the ordinary course of its business keeps such source code or other proprietary technical data on its site.
- (e) On-site access shall be provided at the Contractor's facility. The Contractor may establish suitable confidentiality agreements.
- (f) For the purpose of requirements (d) and (e) above, access shall not include the right to make copies, either electronic or physical, of materials made available to the Contract Administrator.
- (g) Seven (7) copies of the specific submittals shall be provided prior to FDR in paper and electronic format. Each drawing submittal shall include one reproducible on Mylar, sepia, or equivalent.

### **11.2.3 Design Baseline**

- (a) For the purposes of change control, the design baseline for all program elements shall be established at the FDR.
- (b) The Contractor shall submit to the Contract Administrator for approval changes beyond FDR that affect the design characteristics agreed to at FDR.

### **11.2.4 Mock-Ups and Prototype Equipment**

#### **11.2.4.1 Mock-Ups**

The Contractor shall provide mock-ups of equipment designs for evaluation during any of the three design reviews.

- (a) Mock-ups shall be either real equipment, or if real equipment is not available, a substitute media subject to the review and approval of the Contract Administrator.
- (b) Presentation of all customer and Agency personnel interface panels, operation and display messages shall be subject to mock-up for use in focus groups.

#### **11.2.4.2 Prototype Equipment**

The Contractor shall provide prototypes of each custom designed equipment and operational software that allows evaluation under simulated operation in an in-service environment. The prototype shall include at least the following:

- (a) Fully operational unit
- (b) All interfaces operational
- (c) All software and firmware operational
- (d) Customer interface functions.

Any prototype equipment that requires few or no changes may be used as the unit designated for Factory Acceptance Testing (FAT) subject the review and approval of the Contract Administrator.

### 11.2.5 Production Baseline

- (a) The equipment and software production baseline shall be established after the completion of the Beta Test.
- (b) Changes beyond the completion of the Acceptance Testing associated with the Beta Test shall be documented in the form of change requests and submitted for approval.

**Figure II-11.3**  
**Design Review Items**

#### *Division II Design Review Items*

DR	Reference	Description
1	6.II-1	Customer Service Functions
1.01	6.II-1.2.2	Agency Customer Service Equipment and Services
1.02	6.II-1.2.5	Internet Website
1.03	6.II-1.2.5	Website Accessibility
1.04	6.II-1.3.1	Call Center Standards and Metrics
1.05	6.II-1.3.1	On-Line Knowledge Database
1.06	6.II-1.3.2	Website Standards and Metrics
2	6.II-2.2.1	Common Institutional Program Requirements
2.01	6.II-2.2.2.1	Right-to-Ride Program
2.02	6.II-2.2.2.2	Electronic Voucher Program
2.03	6.II-2.2.2.3	Customized Product Program
2.04	6.II-2.2.2.4	Campus Program
2.05	6.II-2.2.2.5	Human Service Programs
3	6.II-3.1	Card Procurement and Distribution
3.01	6.II-3.2.2	Card Order and Shipping Documentation
4	6.II-4.1	Fare Card Management
4.01	6.II-4.2.2	Card Initialization Information
4.02	6.II-4.2.3	Card Account Data Archive Access
5	6.II-5.1	Clearinghouse Services
5.01	6.II-5.2.1.2	Daily Processing Functions
5.02	6.II-5.2.2	Reconciliation and Settlement
5.03	6.II-5.2.2	Claims Fund
5.04	6.II-5.2.3	Data Upload and Download
5.05	6.II-5.2.4	System Interface and End Point Management
5.06	6.II-5.2.5	Fare Table Management
5.07	6.II-5.2.6	Fraud Management

DR	Reference	Description
5.08	6.II-5.2.8	Database Management
5.09	6.II-5.2.9	Audit
6	6.II-7.1	Financial Management
6.01	6.II-7.2.1	Cash Management
6.02	6.II-7.2.2	Fee Management
6.03	6.II-7.2.3	Merchant of Record
7	6.II-8.1	Communications Network
7.01	6.II-8.2.3	Network Management
7.02	6.II-8.2.4	Data Management
8	6.II-9	Revalue Network Equipment and Services
8.01	6.II-9.1	Revalue Network Systems and Support

**Division III Design Review Items**

DR	Reference	Description
101	6.III-2	Fare Card
101.01	6.III-2.2.1	Card Operating System
101.02	6.III-2.2.1	Contactless Interface
101.03	6.III-2.2.2	Disposable Card
101.04	6.III-2.2.4	Smart Objects
101.05	6.III-2.4.3	Card Data
101.06	6.III-2.4.4	Card Graphics Standards
101.07	6.III-2.7.2	Campus Cards
102	6.III-3	Fare Transaction Processor
102.01	6.III-3.2.2	Smart Card Interface
102.02	6.III-3.2.3	Customer Interface and Display
102.03	6.III-3.4	Physical Appearance and Styling
102.04	6.III-3.6.1	Communications Interface
102.05	6.III-4.1	On-Board Fare Transaction Processor
102.06	6.III-4.1	OBFTP Architecture
102.07	6.III-4.4	Prototype OBFTP Configurations
103	6.III-6	Driver Display Unit
103.01	6.III-6.2.1	Keyboard
103.02	6.III-6.2.2	Display
103.03	6.III-6.2.2	DDU Message Sets
103.04	6.III-6.8.1	DDU Interface Control Document
103.05	6.III-6.8.2	Electronic Farebox Integration
103.06	6.III-6.8.3	King County RCU Integration
103.07	6.III-6.8.4	Community Transit Integration
103.08	6.III-6.8.5	Application Certification
104	6.III-7	Wireless Data On/Off Loading System
104.01	6.III-7.1	On-Board WDOLS Equipment
104.02	6.III-7.1	WDOLS Equipment at Transit Bases
104.03	6.III-7.6	WDOLS Data Exchange
104.04	6.III-7.7	Wireless Security Protection
104.05	6.III-8.5	PFTP WDOLS Equipment
105	6.III-8.1	Portable Fare Transaction Processor
105.01	6.III-8.1	Verifier Only
105.02	6.III-8.1	Full Function PFTP
106	6.III-9.1	Stand Alone FTP
106.01	6.III-9.1	Sound Transit SAFTP Configuration



DR	Reference	Description
106.02	6.III-9.1	WSF SAFTP Configuration
107	6.III-10.1	Integration with Sound Transit TVMs
107.01	6.III-10.1	TVM Credit/Debit/Cash Interface
107.02	6.III-10.1 6.III-10.7	TVM/CDCS Communications Interface
107.03	6.III-10.1 6.III-10.4	Customer Display and Interface
107.04	6.III-10.5 6.III-10.8	Installation and UL Requirements
108	6.III-11.1	Customer Service Terminal
108.01	6.III-11.4	CST CPU
108.02	6.III-11.4	Magnetic Card Reader-encoder
108.03	6.III-11.4	PIN pad
108.04	6.III-11.4	Agent Display
108.05	6.III-11.4	Customer Display
108.06	6.III-11.4	Card Reader/Writer
108.07	6.III-11.4	Keypad/board
108.08	6.III-11.4	Printer-Receipt
108.09	6.III-11.4	Cash drawer
108.10	6.III-11.4	Equipment to Create Photo IDs
108.11	6.III-11.4	Card Dispensing Module
108.12	6.III-11.4	Data communications
108.13	6.III-11.4	Secure Access Module (SAM)
108.14	6.III-11.10	KCM POS Integration
109	6.III-12.1	Data Collection System (DACS)
109.01	6.III-12.3	Data Processing Plan
110	6.III-13.1	Back Office Client Application
110.01	6.III-13.2.1.2	Fare Table Administration
110.02	6.III-13.2.2.1	King County Metro Reporting
110.03	6.III-13.2.2.2	Kitsap Transit Reporting
110.04	6.III-13.2.2.3	Pierce Transit Reporting
110.05	6.III-13.2.2.4	Community Transit Reporting
110.06	6.III-13.2.2.5	Everett Transit Reporting
110.07	6.III-13.2.2.6	Sound Transit Reporting
110.08	6.III-13.3.1	Standard System Performance Reporting
110.09	6.III-13.3.1	System Maintenance Reports
110.10	6.III-13.3.2.1	National Transit Database Reporting
110.11	6.III-13.3.2.2	Common Ridership and Revenue Reporting
110.12	6.III-13.3.3	Ad-hoc Fare Card Ridership and Revenue Reporting
110.13	6.III-13.3.4	Agency Specific Fare Card Ridership and Revenue Reporting
110.14	6.III-13.3.5	Non-Fare Card Transaction Reporting
110.15	6.III-13.4.1	Back Office Client Computer
110.16	6.III-16.7	WSF Integration

## 6.II-11.3 Installation

### 11.3.1 Installation at Agencies

The Agencies will be responsible for vehicle and site preparation per requirements provided by the Contractor in design reviews, and will be responsible for the installation of equipment in vehicles, rail platforms and

ferry terminals. The Contractor shall provide supervisory, technical support for equipment installed by Agencies.

The Agencies will be responsible for site preparation for equipment installed at Agency facilities. Unless otherwise directed by an Agency, the Contractor shall be responsible for the installation, testing and commissioning of equipment installed in Agency facilities including data acquisition computers, customer service terminals, base-mounted wireless data on-off load devices, back office computers, and related equipment.

- (a) The Contractor shall be responsible for the delivery of RFCS equipment and materials to designated Agency locations. Shipping shall be FOB destination with freight, taxes and duties prepaid. The Contractor shall also be responsible for providing local storage and transportation prior to delivery.
- (b) The Contractor shall coordinate with a respective Agency representative and installation shall comply with individual Agency requirements.
- (c) The Contractor shall provide all required vehicle and facility mounting and installation hardware.
- (a) The Contractor shall specify the requirements for the physical installation of equipment and systems at each site including at a minimum space requirements, environmental requirements, communications requirements and connections, and electrical requirements.
- (b) The Agencies will be responsible for the installation of conduit for power lines and data communication lines in Agency facilities and for the installation of such lines on Agency premises.
- (c) The Contractor shall provide any power conditioning and un-interruptible power supply equipment.
- (d) The Contractor's responsibility for installation of equipment at facilities shall include the bolt down of equipment, the connection to power and data communication lines, and the installation testing of equipment to ensure that the units installed are fully functional.
- (e) The installation of on-board equipment shall occur at the relevant Agencies facilities (garage, base) per the requirements of Section 6.III-4.7. The Agencies will be responsible for installation.
- (f) The Contractor shall be responsible for all supervision, technical support, system testing, commissioning and performance. Subject to individual Agency approval, the Contractor may conduct final commissioning, inspection, testing and certification of on-board

equipment on “groups” of vehicles after installation by the Agency.

### **11.3.2 Installation Procedures**

- (a) Unless otherwise specified, installation of the equipment at Agency properties shall only commence upon successful completion of the System Integration Tests.
- (b) The Contractor shall supply detailed procedures for equipment installation and inspection:
  - i. This shall include installation checklists, identifying the equipment, software, installation configurations and settings and other characteristics applicable to the installation process and parameters, and unique to the equipment being installed and the Agency/property of the installation.
  - ii. The Procedures shall provide sufficient information to verify proper installation and interfacing of the equipment with other system facilities.
- (c) Installation checklists shall be submitted to the Contract Administrator a minimum of forty-five (45) days prior to scheduled installation, and shall be subject to the approval of the Contract Administrator and the affected Agency.
- (d) The Contractor shall inform the Contract Administrator, in writing, of any unacceptable conditions during installation. The Contract Administrator will determine what corrective action needs to be taken. Any additional work required of the Contractor will be negotiated and handled through the change order process.
- (e) The Contractor shall notify the affected Agency a minimum of seventy-two (72) hours, excluding weekends and holidays, prior to the scheduling of any inspection at a particular site, and will not conduct any inspection without Agency representation.

## 6.II-11.4 Testing Requirements

### 11.4.1 Overview of Testing

All of the components, subsystems and systems processes constituting the RFCS shall be tested individually and together to ensure that they meet the Contract requirements and provide a properly functioning system. The work under this section shall include all labor, materials, and support services required to completely inspect and test all hardware and software.

Contractor shall be responsible for the performance of all of the tests described below to satisfy the objectives of each testing phase as determined by the Contract Administrator. The Agencies and/or its associates shall oversee the performance of the tests.

The following outlines the testing sequence and describes the different testing stages:

(a) Factory Acceptance Tests (FAT)

Factory Acceptance Testing shall be performed to ensure that the supplied and developed components meet all functional and environmental requirements and specifications. Factory Acceptance Tests are performed prior to onsite installation.

For further details concerning the Factory Acceptance Tests refer to Section 11.4.2.

(b) System Integration Tests (SIT)

System Integration Testing shall be performed to verify that subsystem components, when integrated together, meet the system level functional requirements and specifications. System Integration Testing is completed prior to onsite installation of the system.

For further details concerning the System Integration Tests refer to Section 11.4.3.

(c) Installation Test

Following onsite installation of the equipment, Installation Testing shall be performed. Installation Tests are used to determine if the equipment delivered to the installation site has been installed correctly and functions, component wise, to the requirements and specification.

For further details concerning the Installation Tests refer to Section 11.4.4.

(d) System Commissioning

During the System Commissioning testing phase the installed and integrated system is verified to function according to the system wide requirements. System Commissioning is completed prior to placing the system into revenue service.

For further details concerning the System Commissioning Test refer to Section 11.4.5.

(e) Beta Test

The Beta Test phase begins once the first wave of equipment is placed into revenue service. The Beta Test includes a subset of the systems and services to be provided for the full RFCS rollout. The objective of the Beta Test is to confirm the functional acceptability of the RFC systems and services under revenue service operation before rolling out the full RFCS.

For further details concerning the Beta Tests refer to Section 11.4.6.

(f) Acceptance Testing

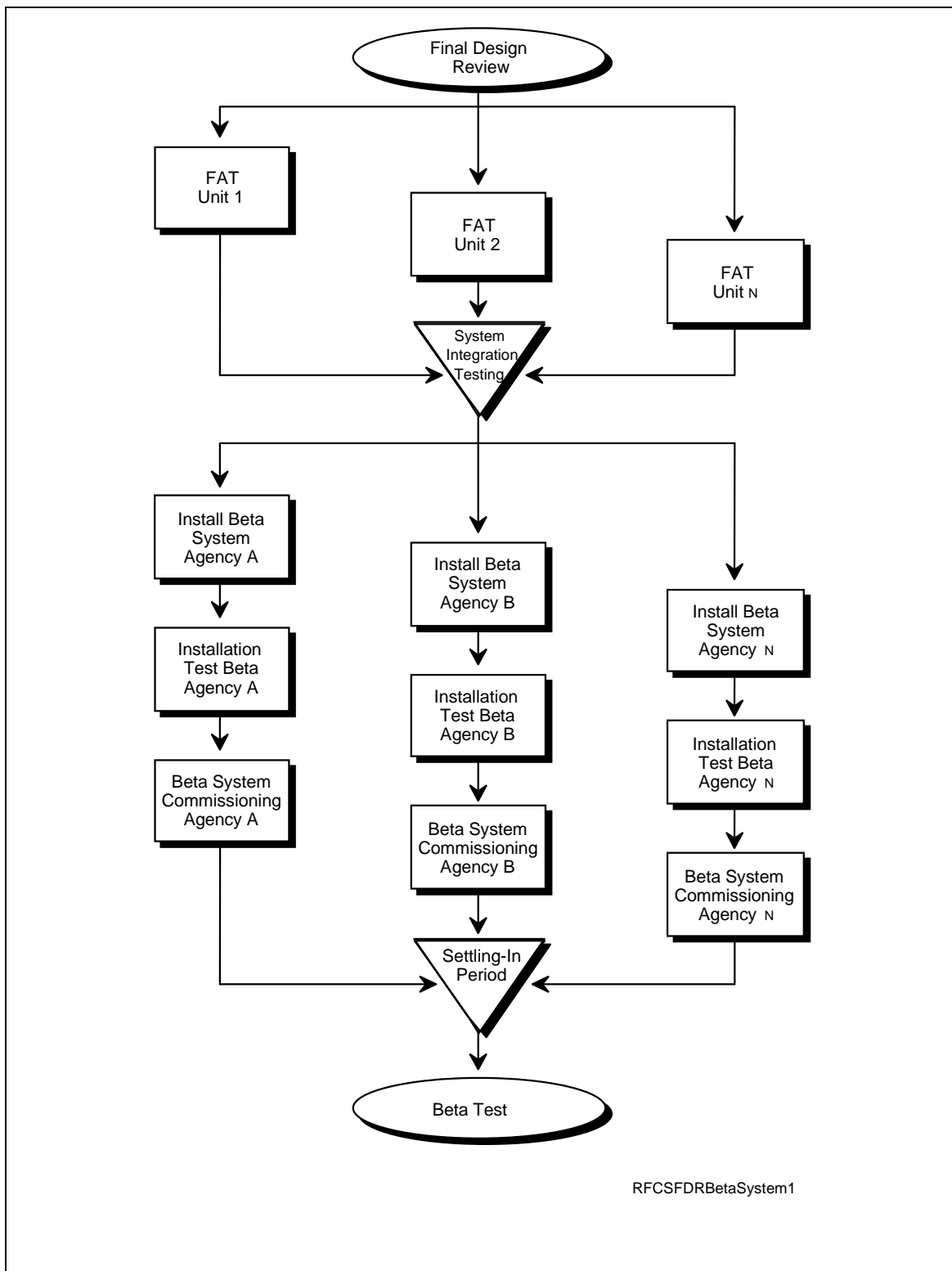
Following successful completion and Agency approval of the Beta Test, full RFCS rollout will begin. Acceptance testing will be performed on all equipment and services placed into revenue service to demonstrate the performance of the system as a whole. The completion of the Acceptance Testing will be contingent upon the system meeting specified performance levels.

For further details concerning Acceptance Testing refer to Section 11.4.7.

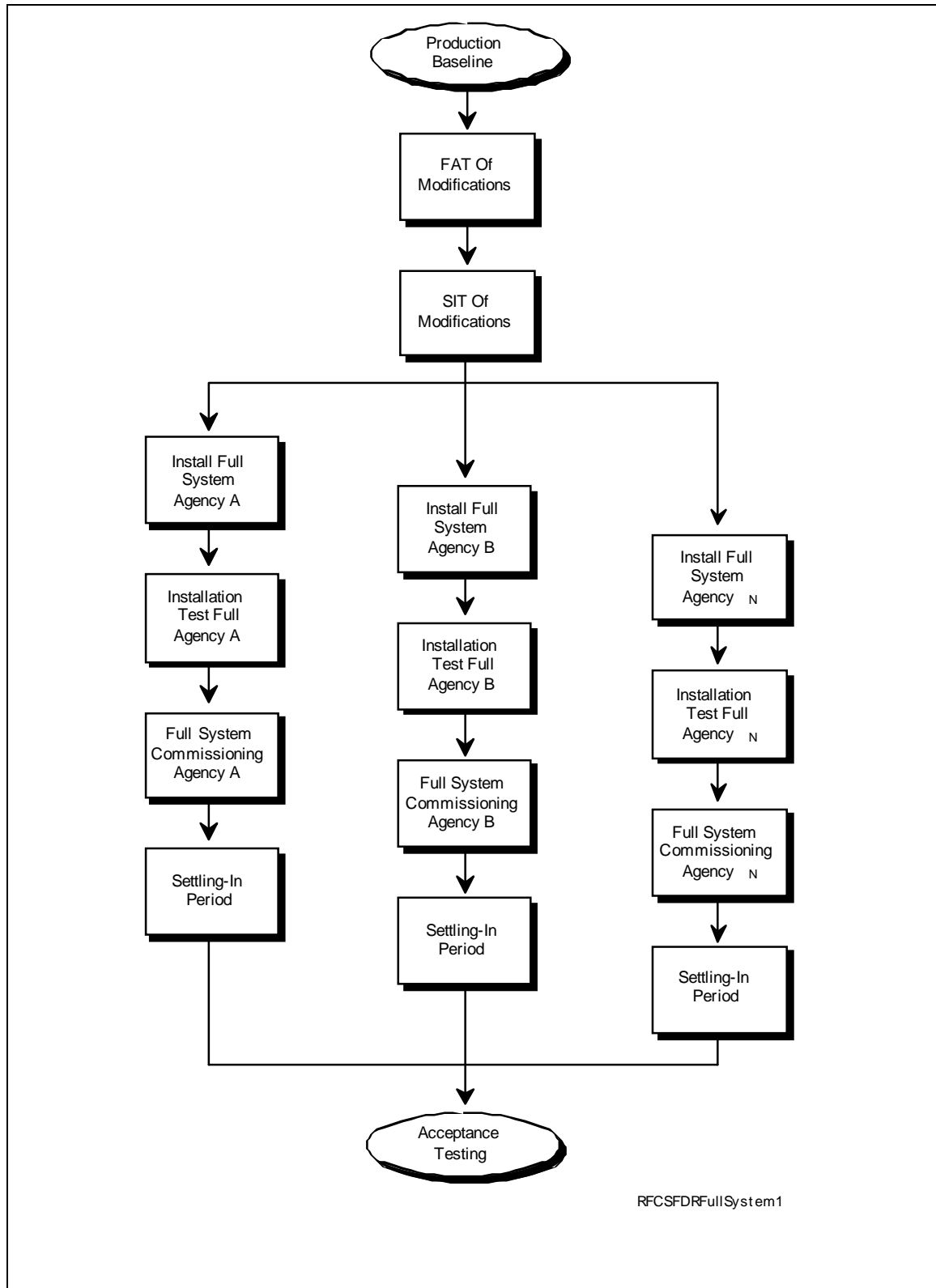
The relationship of the specified test requirements up to completion of the Beta Test is shown in the flowchart provided in Figure II-11.4.

The relationship of the specified test requirements up to completion of the Full RFCS Rollout is shown in the flowchart provided in Figure II-11.5.

**Figure II-11.4**  
**Relationship Of Phase I Testing**  
**(Beta Test)**



**Figure II-11.5**  
**Relationship Of Phase II Testing**  
**(Full RFCS Rollout)**



### 11.4.2 Factory Acceptance Tests (FAT)

The Contractor shall provide a comprehensive Factory Acceptance Test (FAT) program (CDRL 14) that shall consist of the following individual test programs:

- i. Functional Test
  - ii. Environmental Test
  - iii. Electromagnetic Interference Test
  - iv. Radiated Electromagnetic
  - v. Maintainability Test
  - vi. Human Factors Test
- (a) Each equipment type shall be subject to the FAT unless waived by the Contract Administrator.
  - (b) One item of each equipment type shall be tested as described below.
  - (c) If the Contractor can prove by certification of using authority, property, or independent testing organization that equipment manifestly similar to that specified here has been subjected to testing to the extent specified, the associated test may be waived, subject to the Contract Administrator's approval. The Contractor shall submit independently verified tests to the Contract Administrator for approval at least sixty (60) days prior to the scheduled start date for the FAT.
  - (d) Factory Acceptance Testing shall be performed in controlled, laboratory conditions at a Contract Administrator approved factory or independent facilities.

#### 11.4.2.1 Functional Test

The purpose of this test shall be to demonstrate that for each RFCS equipment type, the functions specified throughout this document, including all limiting conditions, shall be met.

- (a) Each item of equipment shall be required to execute all hardware and software functions as detailed in these specifications and to meet the performance criteria requirements.
- (b) The procedures for handling maintenance (troubleshooting and correcting faults) and service functions shall also be written and demonstrated.



- (c) The Contractor shall be responsible for developing a functional test procedure that satisfactorily demonstrates all equipment functions and shall submit this test procedure to the Contract Administrator for approval thirty (30) days in advance of the test.
- (d) Each function specified shall be tested at least ten (10) times prior to confirming success or failure. Each piece of equipment shall have passed the functional test before the environmental tests are started.

#### 11.4.2.2 Environmental Test

Environmental tests shall be performed one (1) time per on-board and outdoor equipment and shall be tested per SAE Recommended Practice J1455 JAN88, as follows:

- (a) Test 1 The Thermal Shock Test shall be per Section 4.1.3.2 of the aforementioned SAE Recommended Practice, and shall use the thermal profile portrayed in Figure 2C of said section, except that:
  - i. The storage temperature limits shall be 25 to +150 degrees Fahrenheit.
  - ii. The presoak shall be 2 hours at 25 degrees Fahrenheit.
  - iii. Hour 24 to hour 25 shall be at 70 degrees Fahrenheit.

Functional tests shall occur immediately prior to and after the 25 hour test period.

- (b) Test 2 The Thermal Cycle Test shall be per Section 4.1.3.1 of the aforementioned SAE Recommended Practice, and shall use the thermal profile portrayed in Figure 2B of said section, except that:
  - i. The temperature limits shall be 10 to +135 degrees Fahrenheit.
  - ii. The chamber temperature shall be held for two (2) hours minimum at the 10 degrees Fahrenheit, followed by two (2) hours minimum at +135 degrees Fahrenheit, followed by two (2) hours minimum at +70 degrees Fahrenheit.
  - iii. Tests shall occur immediately prior to and every thirty (30) minutes during the test period, which will terminate at eight (8) hours minimum, provided that all conditions above are satisfied.
- (c) Test 3 The Humidity Test shall be per Section 4.2.3 of the aforementioned SAE Recommended Practice, and shall use the humidity profile portrayed in Figure 3A, Recommended Humidity 8 Hour Cycle, of said section, except that:

- i. Temperature limits shall be 10 to +135 degrees Fahrenheit.
- ii. Humidity shall be 95% relative humidity (non-condensing).
- (d) Test 4 The Waterfront Test shall be conducted per an approved Waterfront Testing Plan to be prepared by the Contractor. No guidelines/standards currently exist for the testing of equipment to be used in an outdoor marine environment, such as that of the WSF. The Contractor shall prepare a comprehensive test plan, designed to demonstrate the operability of the equipment in the WSF environment, to be conducted at the WSF docks. This Test Plan shall be subject to the approval of the Contract Administrator and WSF.

#### 11.4.2.3 Electromagnetic Testing

- (a) Equipment shall be tested for electromagnetic compatibility per Section 6.III-1.7.1.
- (b) Equipment shall not sustain any permanent damage as a result of the exposure to electromagnetic fields nor shall it lose any data.
- (c) Testing shall take into account the conditions existing at Agency facilities including the radar emissions and radio transmissions from WSF ferry operations, as well as bus tunnel and trolley conditions.

#### 11.4.2.4 Radiated Electromagnetic Energy Test

The Contractor shall identify requirements and demonstrate compliance with applicable Federal Communication Commission (FCC) regulations concerning conducted and radiated radio frequency energy.

#### 11.4.2.5 Maintainability Test

The Contractor shall conduct a maintainability test that consists of introducing faults into the equipment and systems, and then measuring the time required for a technician to correct the fault.

- (a) Thirty (30) days prior to the start of the FAT tests, the Contractor shall submit to the Contract Administrator a Maintainability Test Plan for approval.
  - i. The Maintainability Test Plan (CDRL 15) shall show the basis of sample size selection and list of faults, including a reasonable time limit for repair performed by an average technician based on field experience, to be introduced into the equipment.

- ii. This list shall represent every known failure mode for each unit of equipment and system, next to each fault, the Contractor shall identify.
- (b) The maintainability test shall be conducted in the following steps:
  - i. The Contractor shall provide several units of the equipment to the Contract Administrator to simulate failed components, mis-adjustments, and incorrect settings.
  - ii. The simulated failures shall be introduced in proportion to their expected failure rate.
  - iii. The Contractor's maintenance personnel shall be unaware of the simulated failures and shall be assigned to troubleshoot the equipment.
  - iv. The repair times shall be recorded and the mean-time-to-repair (MTTR) shall be compared with the advance list provided by the Contractor.
  - v. Maintainability Test results shall be reviewed and approved by the Contract Administrator.

#### 11.4.2.6 Human Factors Test

The human factors test shall verify that features and operating characteristics affecting the use of the RFCS by customers and Agency personnel are easy to understand, easy to use, and quick in response to customer and Agency personnel actions. The test shall be designed to evaluate items such as the following:

- (a) Time to perform a transaction.
- (b) Time to reset the device.
- (c) Time initialize the device from a complete power down.
- (d) Time to switch between various operating modes.
- (e) ADA compliance with regard to customer operation controls and instructions.
- (f) Facilitation of transit operator-customer interaction as a human factor.

### 11.4.3 Systems Integration Test

The goal of Systems Integration testing is to connect each RFCS Subsystem and demonstrate the functionality as a fully integrated system prior to on site installation.

#### 11.4.3.1 System Integration Test Plan

Contractor shall develop a System Integration Test Plan (CDRL 16) identifying how each subsystem is integrated such as communications, protocols, and data relationships, including any boundary conditions and security provisions. The Test Plan shall describe procedures to be followed for demonstrating the following, at a minimum:

- (a) Alarm transmission and all other device/component monitoring functions.
- (b) Data transmission, including all control functions, between devices and the DACS.
- (c) Data transmission between devices, DACS and Clearinghouse System.
- (d) Data integrity and security.
- (e) Credit and debit card transaction approvals and rejections (all types).
- (f) Check transaction approvals and rejections.
- (g) Funds reconciliation and settlement.
- (h) Report generation and transmission to Agencies.
- (i) Bad card rejections and lockout.
- (j) Auto revalue of cards.
- (k) Operating ranges for each type of equipment.
- (l) Performance measures.
- (m) Data encryption/security provisions for each type of data transfer.
- (n) Required data anti-collision provisions for each applicable type of data transfer.
- (o) All data transmissions shall be inspected for accuracy. Inaccurate data transmissions shall be recorded as a failure of the particular test for which the transmission was performed.

The System Integration Test Plan shall be submitted for the approval of the Contract Administrator a minimum of thirty (30) days prior to the commencement of System Integration Testing.

#### 11.4.3.2 System Integration Test Bed

Device interface and integration testing, including systems integration, shall be performed in a test-bed located in the Puget Sound Area. Each Agency equipment configuration shall be assembled in a single test-bed ("RFCS test-bed") to permit interconnection to simulate the overall RFCS.

It is not required that the Central System or DACS which support financial and operational data processing be collocated at this site, but it must be possible to interconnect to them using the telecommunications processes to be used in the installed system environment.

The test-bed shall be established prior to the commencement of System Integration Testing.

The Contractor shall be responsible for the test-bed environment until completion of Contract.

The test-bed shall remain operational through the duration of the Contract and shall be updated to reflect any changes to the devices, software and/or system configuration.

#### 11.4.4 Installation Test

Installation Test shall occur any time a new unit of equipment is added on the site or an existing installed unit is exchanged.

Upon verification of proper installation of the equipment, Contractor shall perform a complete post-installation operational test.

- (a) All functions of installed equipment at each location shall be tested under the supervision of Agency representative(s) to ensure operation of the equipment as specified.
- (b) An Installation Test Plan shall be submitted to the Contract Administrator a minimum of thirty (30) days prior to scheduled Installation Testing, and shall be subject to the approval of the Contract Administrator.
- (c) The Contractor shall inform the Contract Administrator, in writing, of any failures during Installation Testing.
- (d) The Contractor shall notify the affected Agency a minimum of seventy-two (72) hours, excluding weekends and holidays, prior to the scheduling of any Installation Tests at a particular site, and will

not conduct any testing without RFCS and relevant Agency representation.

#### **11.4.5 System Commissioning**

Upon completion of Installation Testing, prior to the Beta Test and prior to Full-System Acceptance Testing, all system interfaces and integration functions shall be tested to verify proper operation of the installed RFCS as a whole:

- (a) The Contractor shall develop a System Commissioning Plan (CDRL 17) to demonstrate that all systems are fully operational prior to entering revenue service.
- (b) The System Commissioning Plan shall identify and describe all necessary tests to verify proper interfacing and installation of the equipment with other system facilities, including at a minimum:
  - i. Schedule for system commissioning.
  - ii. Commissioning test period.
  - iii. Procedures for collecting and verifying data from each type of equipment.
  - iv. Procedures for verifying the correct transfer of control commands to each type of equipment.
  - v. Test reports content to be prepared.
- (c) The System Commissioning Plan shall be submitted to the Contract Administrator a minimum of ninety (90) days prior to scheduled System Commissioning Test, and shall be subject to the approval of the Contract Administrator.
- (d) The Contractor shall inform the Contract Administrator, in writing, of any failures during System Commissioning Testing.
- (e) The Contractor shall notify the affected Agency a minimum of seventy-two (72) hours, excluding weekends and holidays, prior to the scheduling of any System Commissioning Tests at a particular site, and will not conduct any testing without RFCS and relevant Agency representation.
- (f) System Commissioning Testing, as described herein and as specified by RFCS, shall be performed at the Agencies facilities.

#### **11.4.6 Beta Test**

The RFCS Beta Test shall demonstrate the same level of system functionality and the services to be provided for full RFCS rollout, and involving Agency personnel just as the full system would require, only on

a smaller scale. The Beta Test shall involve the exercise of the small scale system under revenue service conditions. All functional requirements of the RFC system shall be tested. The estimated equipment quantities for each Agency for the Beta Test are listed in Appendix A.

#### 11.4.6.1 Beta Test Objectives

The primary objectives of the Beta Test shall be to:

- (a) Validate that the system meets the functional, operational, and technical specifications of the fare card program as defined in the RFP under revenue operations.
- (b) Ensure that the fare card technology, system design and implementation meet the internal needs of the individual Agencies in the Region for AFC systems and services, including any specific requirements or constraints with respect to physical implementation or operational processes.
- (c) Provide an assessment of, and field experience with, equipment reliability and maintenance requirements.
- (d) Provide an overall assessment of the program cost effectiveness and fiscal impact for each Agency.
- (e) Determine the appropriate scope of full rollout based upon the outcomes of Beta Test evaluation.

#### 11.4.6.2 Beta Test Settling In Period

The initial period following commencement of revenue service in the Beta Test stage will be known as the Beta Test Settling In period. This period will provide a short time for the Contractor and the Agencies to correct minor implementation errors in advance of Beta Testing. The Beta Test Settling In period will consist of a minimum of ten (10) days.

#### 11.4.6.3 Changes to Agency Business Processes

- (a) The Contractor shall provide information to each Agency regarding each aspect of Beta test implementation, operation, and evaluation that impacts existing Agency operations. This information will be used by each Agency to update their business practices. At a minimum, impacts and required changes shall be identified in the areas of:
  - i. Customer service
  - ii. Revenue management and reporting
  - iii. Ridership data management

- iv. Training
  - v. Equipment installation
  - vi. Equipment operation
  - vii. Equipment testing and maintenance
  - viii. Computer and network operations
  - ix. Inventory and fare media management
  - x. Public transportation operations
  - xi. Marketing
- (b) Changes required to existing Agency business practices shall be identified a minimum sixty (60) days prior to the scheduled start of the Beta test.

#### 11.4.6.4 Test Equipment, Documentation and Training

All test equipment, documentation and training required for the Beta test shall be provided by the Contractor a minimum sixty (60) days prior to the scheduled start of the Beta test.

#### 11.4.6.5 Beta Test Plan

- (a) The Contractor shall prepare and submit a Beta Test Plan (CDRL 18) to the Contract Administrator for review and approval sixty (60) days prior to the scheduled start of the Beta test.
- (b) At a minimum, the Beta Test Plan shall include:
- i. Schedule of all development, installation testing and implementation activities.
  - ii. Description of proposed tests, procedures, recording methods, and test equipment per Section 6.II-11.4.8. Included in this shall be a series of control tests where specific transactions can be traced end-to-end through the system.
  - iii. Contractor recommendations of fare cards and infrastructure elements required to meet the objectives of the Beta test.
  - iv. Agency training and documentation.
- (c) The Agencies reserves the right to make changes to the Beta Test Plan as required and deemed necessary to meet and evaluate Beta test objectives.
- (d) The final Beta test infrastructure is subject to approval and confirmation by the Agencies.



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11.4.6.6 Certification of Beta Test Readiness

Prior to beginning the Beta Test, the Contractor shall submit a Certification of Beta Test Readiness (CDRL 19) to the Contract Administrator. At a minimum, the Certification of Beta Test Readiness shall certify that:

- (a) The Contractor has completed and the Contract Administrator has accepted the Beta Test Plan and all related procedures;
- (b) The Contractor has submitted and the Contract Administrator has accepted all deliverables required to be submitted prior to conducting the Beta Test;
- (c) The Contractor has submitted and the Contract Administrator has accepted all required intellectual property documentation;
- (d) The Contractor has provided all training required to be conducted prior to beginning the Beta Test;
- (e) The Contractor has satisfied all applicable pre-test conditions imposed by this Contract or the accepted Beta Test Plan;
- (f) The Contractor has completed all applicable software coding;
- (g) The Contractor has completed installation of all equipment to be used in the Beta Test;
- (h) All required systems are integrated, on-line, and ready for use;
- (i) The Contractor will conduct the Beta Test in complete conformity with the Beta Test Plan and the Contractor is aware of no matters which will adversely affect its ability to do so;
- (j) The Contractor is ready to begin the Beta Test immediately.

The Contractor shall not commence the Beta Test until the Contract Administrator has issued a Notice of Apparent Completion for the Beta Test Readiness Milestone per Section 3.I-27.6. The Contractor shall promptly provide any documentation or information requested by the Contract Administrator to assist in the Contract Administrator's review of the Certification or the Contractor's state of readiness.

#### **11.4.7 Acceptance Test**

Acceptance testing shall be performed at a system level after the start of revenue service, with all components and subsystems completely functional, operational, on-line, and in service.

- (a) Acceptance testing shall be conducted by the Contractor in cooperation with Agency personnel and shall be subject to review and approval by the Agencies.
- (b) The RFCS will be installed in phases, acceptance testing of the equipment may also be conducted in phases.
- (c) Contractor may choose to group installed and commissioned equipment by Agency, by groups of Agencies, by equipment type across the entire system, according to start-up date, or other grouping approved by the Contract Administrator for acceptance testing purposes.
- (d) Reliability calculations for a particular equipment type in a group will remain consistent throughout the acceptance testing period.
- (e) Grouping of devices for Acceptance Testing shall be described in detail in Contractor's Acceptance Testing Plan and shall be subject to Contract Administrator approval.
- (f) The Agencies reserve the right to make changes to the Acceptance Testing Plan to demonstrate conformance with the Contract requirements.
- (g) Acceptance requirements for equipment installed for WSF will be determined at the time of Implementation.

##### **11.4.7.1 Acceptance Testing Settling In Period**

The initial period of time following the completion of Phase II installation shall be designated as the Acceptance Testing Settling In period.

- (a) The Acceptance Testing Settling In period will last for at least thirty (30) days of revenue service prior to beginning Acceptance Testing.

- (b) During the Acceptance Testing Settling In period a failure review test process shall be established (CDRL 20) by the Failure Review Team.
- (c) At the end of the Acceptance Testing Settling In period the Mean Transactions Between Failures (MTBF) for high transaction volume equipment of the same type shall be not less than 40% of the MTBFs presented in Division III for each type of RFCS equipment.
- (d) For equipment of the same type in a low transaction volume environment, the mean operating hours between failures (MOHBF) in a group shall be not less than 40% of the mean hours between failures presented in Division III for each type of RFCS equipment.
- (e) If at the end of the Acceptance Testing Settling In period the above MTBF and mean operating hours between failures (MOHBF) criteria are not met, then the reliability of the equipment shall be monitored until these criteria are met for thirty (30) consecutive days.
- (f) Acceptance testing shall not commence until the MTBF and MOHBF requirements in (c) and (d) above are met.

#### 11.4.7.2 Acceptance Test Plan

Contractor shall develop a Acceptance Testing Plan (CDRL 21).

- (a) The plan shall be a comprehensive and detailed document, describing the management, monitoring, recording, and reporting procedures that will govern the acceptance testing period.
- (b) The Acceptance Testing Plan shall be submitted to the Contract Administrator for review and approval sixty (60) days prior to the scheduled start of the Acceptance Test period.
- (c) The Agencies reserve the right to make changes to the Acceptance Testing Plan to demonstrate conformance with the Contract requirements.

#### 11.4.7.3 Acceptance Test Requirements

At the end of the settling period, Acceptance Testing shall begin and shall be conducted over a minimum of one hundred and eighty (180) days under revenue service conditions.

- (a) The acceptance testing shall be conducted in three performance periods related to the reliability of the system. The MTBF and

MOHBF requirements during the acceptance testing shall be incrementally increased from the settling period values in sixty (60) consecutive day periods as follows:

- i. **0-60 days:** 60% of the MTBF and mean hours of operation between failures specified in Division III for each type of RFCS equipment.
  - ii. **61-120 days:** 80% of the MTBF and mean hours of operation between failures specified in Division III for each type of RFCS equipment.
  - iii. **121-180 days:** 100% of the MTBF and mean hours of operation between failures specified in Division III for each type of RFCS equipment.
- (b) Each subsequent acceptance testing period shall not commence until the all requirements specified for the previous period of testing have been met.
  - (c) During the Acceptance Testing period, chargeable failures shall be identified and recorded per Section 6.III-1.5.3.
  - (d) Within fifteen (15) days following the completion of each period of Acceptance Testing, Contractor shall provide all testing data, documentation, reports, and all other related information to the Contract Administrator.
  - (e) For any single group, if after sixty (60) consecutive days, the MTBF and MOHBF for that period has not been met, the acceptance testing shall continue beyond the sixty (60) consecutive days until the equipment has achieved the applicable reliability requirement.
  - (f) Under no circumstances shall the acceptance testing for any group be allowed to proceed to the next sixty (60) consecutive day test period until the previous criteria has been met by that group.
  - (g) For each group, the MTBF for high transaction volume devices for a given sixty (60) consecutive day period shall be derived by summing all the transactions for the sixty (60) consecutive day period for that group and device type and dividing by the number of chargeable failures recorded during that period for that group and device type.
  - (h) If for any reason, a test period is not comprised of sixty (60) consecutive days, then the average MTBF shall be calculated by summing the transactions and chargeable failures for each individual test period, totaling not less than sixty (60) days of test data.

- (i) Should the equipment fail to meet the performance requirements as specified herein, Contractor shall make whatever improvements to the equipment and/or systems which are needed to meet the requirements.
- (j) Contractor shall continue to improve RFCS equipment and systems until the Contract requirements are met.
- (k) The Agencies reserve the right to limit the cut-over of the installed equipment if the acceptance test requirements are not being met.

#### **11.4.8 General Testing Procedures and Definitions**

##### **11.4.8.1 General Procedures**

For each inspection and test, the Contractor shall:

- (a) Prior to testing or inspection, submit a detailed Test Procedure to the Contract Administrator for review and approval (CDRL 22) a minimum of thirty (30) days prior to conducting the test.
- (b) Provide check-off sheets for the items to be inspected, measurements to be taken, features required to be present, and the criteria required to be met.
- (c) Be responsible for all Contractor, Supplier and Subcontractor inspections and tests to be performed, including those performed under the Contractor's Quality Assurance plan.
- (d) Any and all hardware and software not passing inspections and/or tests and not meeting the approval of the Contract Administrator shall be repaired, replaced, and/or corrected by the Contractor and rescheduled for inspection and testing.
- (e) Receive approval from the Contract Administrator prior to proceeding with any tests or inspections.
- (f) Submit the final report to the Contract Administrator for review within thirty (30) days after completion of the inspection or test.
- (g) Retain all inspection and test results for a period of not less than two (2) years, during which the results shall be available for Agency review.
- (h) The Agencies reserve the right, at their discretion, to witness any or all inspections/tests, using Agency personnel and/or Consultants and agents.

- (i) In addition, the Agencies reserve the right to develop additional test procedures to be performed by the Contractor or other designated organizations.
- (j) The Contractor shall pay all Contractor-incurred travel, accommodation and living costs for the witnessing of inspections and tests.

#### 11.4.8.2 Test Plan

The Contractor shall prepare a test plan and applicable procedures, that shall govern the conduct of activity, surveillance, direction, and methods of observing and recording the pertinent data. The Contractor shall provide an Overall Inspection and Test Plan (CDRL 23) and specific Test Plans for each specific test. The Contract Administrator shall approve the test plan prior to proceeding with testing. As a minimum, the following elements shall be included in the test plan:

- (a) Dates, times and locations of testing.
- (b) Support and calibration tools and instrumentation to be used.
- (c) Technical publications to be referenced.
- (d) Spares and consumables to be available.
- (e) Maintenance facilities needed.
- (f) Staffing requirements to be met.
- (g) Scheduling of personnel.
- (h) The format and specific data to be collected during the test period together with the method used to report the test results.
- (i) Preventive maintenance tasks to be performed during the test.

#### 11.4.8.3 Test Procedure Outline

The test procedure shall include, as a minimum, the following:

- (a) Objective of test.
- (b) Test environmental conditions.
- (c) Detailed description of test specimens including drawings, part numbers, inspection and test records, maintenance records, and calibration records.
- (d) Detailed procedure of test.

- (e) Test equipment to be used, including any measuring equipment and/or any equipment aiding in the performance of the tests.
- (f) The level and schedule of preventive maintenance during the test.
- (g) Pass/fail criteria.
- (h) Retest procedure.
- (i) Test data sheet format.
- (j) Test notification to engineer.
- (k) Test reports.

#### 11.4.8.4 Test Tools and Logging

At a minimum, the Contractor shall maintain the following capabilities:

- (a) Automated tools for measuring and capturing data packets and data flows at each major interface, from end to end, between subsystems. The test tools may include standard off the shelf communications software or customized in house trace and logging software. In the design review, the contractor shall propose a suite of tools and describe the methodologies for use.
- (b) Automated test tools shall be thoroughly documented in their use.
- (c) The test plan and procedures shall include the ability to automatically identify points of data corruption or transmission failure.
- (d) The reporting of test data must be made in English, and provide the ability to sort by time, event type and other key attributes, so that an end to end verification of data flows can be readily obtained.
- (e) Event log messages shall be logically grouped and labeled, fully parsed, and loaded into a database in a production manner, so that they are readily available for troubleshooting and analysis.

#### 11.4.8.5 Test Reporting

The Contractor shall provide a complete report documenting the operation and reliability during all acceptance testing. The report shall be in a form acceptable to the Contract Administrator. Test Reports are contract deliverables under CDRL 24.

#### 11.4.8.6 Test Failure Resolution

The test procedures shall describe the process to be followed for the resolution of test problems, failure recurrence control, and general test conduct ground rules.

#### 11.4.8.7 Type I and Type II Failures

##### 11.4.8.7.1 Type I Failures

A Type I failure is a malfunction resulting from conditions beyond the control of the Contractor, or failures that are minor in nature and quickly corrected. Type I failures may include:

- i. Power or communications outage.
- ii. “Jams” of mechanical equipment.
- iii. Accidents or mishandling.
- iv. Localized equipment failures.
- v. Test facility or instrument failure.

The following shall apply to Type I failures:

- (a) Unless otherwise approved by the Contract Administrator, the test period shall be suspended for the time necessary to make the corrections, and testing shall resume starting at the time testing was suspended.
- (b) Time suspension shall begin when the failure is first noticed, and it shall extend only as long as required to correct the failure.
- (c) If a second Type I failure occurs in the same device, the Contractor shall provide evidence that the failures were distinct and unrelated in order to be classified as Type I. Final determination shall be made by the Failure Review Team per Section 6.III-1.5.3.

##### 11.4.8.7.2 Type II Failures

A Type II failure is a malfunction that involves conditions within the control of the Contractor, failures related to the system design, or failures



that may be of a minor or major nature that cannot be easily and quickly corrected. Type II failures include, but are not limited to:

- i. Two of the same Type I failures that occur after the first Type I failure has been corrected.
- ii. Three or more Type I failures (related or unrelated) in the same device.
- iii. Design deficiencies.
- iv. Software or firmware problems or recompilations.
- v. Failure to meet performance requirements.

Unless otherwise approved by the Contract Administrator, the test period shall be restarted to time zero after corrections are made.

### **6.II-11.5 Progress and Performance Monitoring**

The Contractor shall provide a Quality Assurance Program Plan (CDRL 25) specifically for this project and such a plan shall be in place and adhered to throughout this project. Additionally, the Contractor shall provide an overall Program Management, Progress and Performance Monitoring Plan (CDRL 26) which describes how the RFCS program is managed, administered, and controlled with respect to contract Administrator Contract management processes.

#### **11.5.1 Progress and Performance Reviews**

For the duration of the Contract, the Contractor shall participate in monthly progress and performance reviews in Seattle.

##### **11.5.1.1 System Design and Engineering, and Implementation**

- (a) The Contractor shall participate in regular project status reviews with the Agencies and their consultants, and shall provide detailed reports on the progress of the RFCS, beginning with the Contract award through the completion of the full RFCS rollout.
- (b) These reviews may be held as often as is deemed necessary by The Contract Administrator, depending upon the stage and progress of the project.
- (c) The reviews may be combined with design review meetings.

**11.5.1.2 Post Rollout**

Once the RFCS rollout is completed, the Contractor shall participate in system performance reviews with the Agencies and their consultants, and shall provide detailed reports on the performance of the RFCS, including at a minimum the following:

- (a) Equipment and system performance:
  - i. Failure analysis
- (b) On-time and accurate delivery of Agency reports.
- (c) Number of calls received, at a minimum including, customer service, Agency inquiries, maintenance.
- (d) Number of calls responded to, at a minimum including, customer service, Agency inquiries, maintenance.
- (e) Average response time for each call category.

**11.5.2 Status Reporting**

The final format of a status report which aggregates the inputs from all parties shall be agreed between the Agencies and the Contractor, immediately after award of the Contract. The Contractor shall provide Monthly Progress Reports (CDRL 27). At a minimum, the following information shall be provided:

- (a) Current Overall Status
  - i. Items Delivered
  - ii. Items Outstanding
  - iii. Progress Versus Implementation Plan
- (b) Issues and Resolution
  - i. Technical
  - ii. Third Parties
  - iii. Other

### 11.5.3 Problem Reporting

In addition to status reports issued on an on-going basis, the Contractor shall implement a separate problem tracking, resolution and reporting system.

- (a) Problem tracking and resolution report logs shall be provided to The Contract Administrator as part of the Fault Tracking and Maintenance Performance Report (CDRL 10).
- (b) The degree of automation to be employed for this activity shall be agreed between the Contract Administrator and the Contractor, but regardless of the degree of automation, it shall perform the following functions at minimum:
  - i. The system shall assign numbers to problems as they are reported to enable accurate tracking.
  - ii. Each problem shall be logged on the date reported.
  - iii. The log shall be updated as the status of the problem changes and provide the following minimum information:
    - Anticipated solution
    - Date solution is to be provided
    - Date solution was provided
    - Date solution was tested
    - Results of the test
- (c) Problems shall not be closed until the solution has been successfully tested and has been “signed-off” by the Contractor and the Contract Administrator.

## 6.II-11.6 Contract Document Requirements List (CDRL)

### 11.6.1 Contract Documentation Requirements

The Contractor shall comply with the requirements for the submission of schedules, reports, plans, certificates, and other data listed in the specification documents.

- (a) Acceptance of CDRL items are subject to Contract Administrator review and approval.
- (b) CDRLs will not be considered complete until formally approved by the Contract Administrator.

## 11.6.1.1 Document Requirements

Technical and other required documentation shall be submitted in accordance with the Contract Document Requirements List.

- (a) Seven (7) copies of documentation in paper and electronic format shall be provided. In addition, each drawing submittal shall include one reproducible on Mylar, sepia, or equivalent.
- (b) Figure II-11.6 provides a list of the required CDRLs.
- (c) Unless noted otherwise, CDRLs shall be submitted as follows:
  - i. In outline form at Conceptual Design Review.
  - ii. In draft form at Preliminary Design Review.
  - iii. In final form at Final Design Review.

**Figure II-11.6**  
**Contract Document Requirements List (CDRL)**

CDRL	Submittal Description	Reference	Notes
1	Conceptual Design Review	6.II-11.2.2.1 6.III-3.2.0 6.III-6.2.2	
2	Preliminary Design Review	6.II-11.2.2.2 6.III-9.2 6.III-1.6.1 6.III-1.6.2	
3	Final Design Review	6.II-2.2.2.5 6.II-11.2.2.3	
4	Call Center and Internet Standards, Metrics and Reports	6.II-1.3.1 6.II-1.3.2	
5	System Backup and Recovery Plan	6.II-5.2.8 6.II-8.2.3 6.III-1.4 6.III-3.8	
6	NSF Plan	6.II-7.2.1	
7	Revalue Network and Support Services Plan	6.II-9.3	
8	Maintenance Plan	6.II-10.1 3.I-58.1.3	
9	System Wide Spares Inventory Report	6.II-10.1	(1)
10	Summary Fault Tracking and Maintenance Performance Report	6.II-10.1 6.II-11.5.3 3.I-58.1.4	(1)
11	Telephone Support Procedures and Performance Measurements	6.II-10.2.2	
12	Telephone Support Statistics Report	6.II-10.2.2	(1)
13	Implementation Plan	6.II-11.1.1 6.II-11.1.5	(2)
14	Factory Acceptance Test (FAT) Program	6.II-11.4.2	(2)
15	Maintainability Test Plan	6.II-11.4.2.5	(2)
16	System Integration Test Plan	6.II-11.4.3.1	(2)
17	System Commissioning Plan	6.II-11.4.5	(2)
18	Beta Test Plan	6.II-11.4.6.5	(2)

CDRL	Submittal Description	Reference	Notes
19	Certification of Beta Test Readiness	6.II-11.4.6.6	(2)
20	Failure Review Process	6.II-11.4.7.1	(2)
21	Acceptance Testing Plan	6.II-11.4.7.2	(2)
22	Test Procedures	6.II-11.4.8.1	(2)
23	Overall Inspection and Test Plan	6.II-11.4.8.2	(2)
24	Test Reports	6.II-11.4.8.5	(2)
25	Quality Assurance Program	6.II-11.5	(2)
26	Program Management and Progress Plan	6.II-11.5	(2)
27	Monthly Progress Reports	6.II-11.5.2	(1)
28	Training Program Plan	6.II-12.1.1	(2)
29	Training Materials	6.II-12.3	(2)
30	National Architecture Conformance Plan	6.III-1.2.2	
31	System Security Plan	6.III-1.3	
32	Electromagnetic Compatibility Plan	6.III-1.7.1	
33	Required Manuals Schedule	6.III-1.8.2.1	
34	System Operations Manual	6.III-1.8.2.4	(2)
35	System Maintenance Manual	6.III-1.8.2.5	(2)
36	Required Maintenance Tools	6.III-1.8.2.5	(2)
37	Software Documentation	6.III-1.8.2.6	(2)
38	Current Parts List	6.III-1.8.2.7	(2)
39	System Availability Measurement Plan	6.III-1.5.2	
40	Non-Fare Applications	6.III-14.1	
41	Contract Close-Out Transition Plan	2.I-4.1.1	(2)
42	Baseline Project Schedule		(2)

**Notes:** (1) Include in monthly or other periodic reports.  
(2) CDRL delivery to be coordinated with associated milestone.

## 6.II-12 TRAINING REQUIREMENTS

### 6.II-12.1 General Requirements

The Contractor shall develop and conduct programs to train personnel in all aspects related to the equipment, hardware, support and diagnostic equipment, and software provided under this Contract. The Contractor shall:

- (a) Provide personnel with information and skills needed to operate, maintain, and support the equipment.
- (b) Offer at a minimum the courses listed in Figure II-12.1.
- (c) at the Agency's request, provide Agency personnel training after system implementation through the duration of the Contract. The prices for such training shall be as specified in Contract Exhibit 9.
- (d) Develop a comprehensive training program covering all necessary management, service, operations and maintenance skills and procedures for Contractor personnel. The parameters, approach and materials for Contractor personnel training shall be subject to Contract Administrator approval.
- (e) Training Manuals shall reference and/or incorporate the content of the Operations and Maintenance Manuals where appropriate.

#### 12.1.1 Training Program Plans

The Contractor shall develop and submit to the Contract Administrator for approval a Training Program Plan (CDRL 28) comprising two (2) parts - one addressing training courses designed for Agency personnel, the other addressing the Contractor's training program for Contractor personnel.

The plans are to be based upon criteria identified in this specification. Both Training Program Plans are to be submitted to the Contract Administrator for approval no later than one hundred and fifty (150) days after Notice To Proceed. Each plan shall, at a minimum, provide the following for each course:

- (a) Brief course description.
- (b) Expected performance objectives and how the expected objectives will be measured.
- (c) Outline for the course content.
- (d) Type or method(s) of presentation that will be used.
- (e) Resources required (equipment, classroom/shop space, supplies).

- (f) An estimated time schedule to train (based on the required number of hours and/or sessions of instruction) employees.
- (g) Intended audience and the maximum class size.

## 6.II-12.2 Training Courses

The training program shall offer separate courses to address the different disciplines and personnel needs within the Agency organizations. In addition to the courses identified in Figure II-12.1, the Contractor may propose other courses.

**Figure II-12.1**  
**Training Course Matrix & Time Table**

Training Course
RFCS Overview
System Operations
Repair and Maintenance
Data Management
Customer Service and Marketing
Train-the-Trainer

### 12.2.1 RFCS Overview Course

The RFCS Overview Course shall be designed to provide management, supervisory, and engineering personnel with an overview of the system, including a functional understanding of the equipment and software. The course shall cover the marketing and customer support responsibilities of the Contractor, the Agency interface with Contractor personnel, and the function of each device, including the interrelationships of the equipment with customers and Agency employees.

Personnel attending RFC Overview training sessions will include management personnel, public relations personnel, engineers, and other administrative and revenue servicing /accounting personnel.

**12.2.2 Operations Course**

The Operations Course shall be designed to provide Agency and designated Contractor personnel with the functional understanding of all RFC system components. This course shall also convey an understanding of the interrelationships of the equipment with customers and provide equipment monitoring and cleaning maintenance instructions to Agency personnel.

**12.2.3 Repair and Maintenance Course**

The Repair and Maintenance Course shall be designed to provide Agency service personnel and maintenance technicians with the knowledge and skills required to perform Agency preventive and corrective maintenance of the RFC systems. At a minimum, the course shall cover the operating software, maintenance of special test equipment (portable and stationary) provided, and built-in tests features.

This course shall also provide repair and maintenance personnel with the training necessary to de-install and install equipment maintained through the Maintenance Program; manage the related spares inventory at Agency facilities; and interface with DACS in the administration of the Maintenance Program. The course shall include Level 2 and 3 circuit board and component level maintenance training for devices or systems maintained by the Agencies, including the Radio Control Unit (RCU) described in Section 6.III-6.8.3.

**12.2.4 Data Management Course**

The Contractor shall develop and deliver a course to train Agency and Contractor personnel in the procedures required to interface with the Clearinghouse system. These include all the procedures required to support financial settlement, reconciliation and adjustments, to access financial and statistical data from various DACS, to manage the associated movement of funds, and to produce standard and custom reports. This course shall also provide to Agency personnel an descriptions and processes for Contractor-related operations, including the financial settlement, call handling, and data management processes.

**12.2.5 Customer Service and Marketing Course**

The Contractor shall develop and deliver a course to train Agency and Contractor personnel in the procedures for customer service and ongoing marketing activities. Among other topics, this course shall address Customer Service “counter training” for personnel interacting directly with the public.

**12.2.6 Train the Trainer Course**



The Contractor shall provide a "Train the Trainer" course. This course shall be designed to train supervisory personnel at participating Agencies to deliver any of the proposed training courses (as applicable to that Agency) subsequent to the Contractor's involvement. This class shall be sufficiently detailed and identify the resources and the number of instruction hours necessary to complete the program.

### 6.II-12.3 Training Materials

- (a) The Contractor shall provide a list of training materials required for each course discussed in the Training Program Plan (CDRL 29).
- (b) The Contractor shall reflect all changes and revisions to the installed RFCS in all training materials, whether supplied to Agencies, or used in Contractor-conducted training courses.
- (c) At a minimum the following training materials shall be provided for each course: instructor guides, student workbooks, mock-ups, scale models, overhead transparencies and/or slides, and video-taped demonstrations.
- (d) All Instructor and student books shall be loose leaf bound, camera ready copies that are printed on 8<sup>1</sup>/<sub>2</sub> x 11 inch paper, double sided. The Contractor shall also be responsible for providing instructor and student books in electronic form on CD ROM in the following formats:
  - i. Text shall be provided in the latest version (current production version at deployment, as agreed to by the Contract Administrator) of Adobe Acrobat and Microsoft Word or approved commercially available word processing program.
  - ii. Drawings shall be provided in .eps or .dxf file formats.
  - iii. Graphics files shall be provided in TIFF, GIF and/or JPEG file formats.
- (e) If the Contractor identifies proprietary information contained in such documents that should not be available to the general public, then the Contractor is responsible for implementing the proper security measures for restricting access. Agency personnel and designated advisors or consultants shall have free access to such documentation.
- (f) All final materials required for training classes shall be delivered to the Agencies at least two weeks prior to the scheduled start date of the class. All training materials shall use English text and shall become the property of the Agencies.
- (g) The Contractor shall be responsible for updating training materials to reflect current RFCS parameters in the event that changes are made to the system or operational procedures. Such materials shall be updated and maintained by the Contractor throughout the life of the Contract.

- (h) At the end of the Contract, all such materials shall become property of the Agencies.

#### **12.3.1 Instructor Guides**

Instructor guides for all training classes identified in the Training Program Plan shall include:

- (a) Course agenda and objectives.
- (b) Resources and facilities required for the course.
- (c) Detailed lesson plans or outlined presentations and discussion guides.
- (d) Pre- and post training assignments.
- (e) Instructions for using any audio-visual support, mock-ups, and scale models.

The Contractor shall provide one hundred (100) copies of instructor guides for each course to the Agencies.

#### **12.3.2 Student Workbooks**

The Contractor shall provide for each course in the Training Program Plan a student workbook. The student workbook shall contain all materials necessary to help the student understand the lessons being presented and serve as an on-the-job reference. The workbook shall include paper copies of all the transparencies, lecture outlines, lesson summaries, and other information that will help students understand the material and apply their knowledge in the field environment. The workbook shall also include step-by-step instructions for the operation of each device in the RFC system, and a trouble-shooting guide for Transit Operators.

#### **12.3.3 Mock-Ups and Scale Models**

The Contractor shall provide mock-ups and scale models to be used as instructional aids during the training courses. Mock-ups and scale models are to be constructed of secure, durable materials that will survive ten (10) years of use in a classroom environment.

#### **12.3.4 Overhead Transparencies**

Overhead transparencies (view-graphs) used in training shall be supplied along with camera-ready copy. Master copies of slides and other audio-visual materials shall be provided to allow for reproduction as necessary.

**12.3.5 Video Tapes and Interactive Computer Programs**

- (a) Video tapes and interactive computer programs shall be provided, where applicable, as an instructional aid to the course material. These media shall also be available to permit Agency personnel to train, refresh, or update themselves at the Agency facilities.
- (b) Video tapes shall thoroughly cover the topic discussed. Video tapes shall be identified according to subject. A master list of video tapes, cross referenced to the instructor's syllabus, shall be provided. Interactive computer programs shall be furnished on compact disk (CD ROM).
- (c) Instructional video tapes are to be of professional quality recorded on standard 1/2 inch US format VHS film. Protective cases shall be provided for all videos. All material must be supplied in either audio or video format including but not limited to close captioned for hearing impaired.

**6.II-12.4 Classroom and Practical Training Space**

Training shall be conducted at Agency facilities or at a central location in Puget Sound Area to be agreed between Contractor and Agencies. All required training equipment such as slide projectors, videocassette recorders/players, monitors, computers, screens, easels and similar equipment shall be provided by Contractor.

**6.II-12.5 Training Program Approval and Instructor Qualification**

The Contract Administrator shall have the rights to review, approve and accept all of the training materials and course work prior to the Contractor's use in execution of training. The Contractor shall warrant that all instructors are fully qualified to present the course material. The Contract Administrator shall reserve the right to request replacement of instructors it deems to be unqualified or whose performance it deems unsatisfactory for any reason.